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Contractors and Engineers Monthly

Vol. 45, No. 9 SEPTEMBER, 1948 $3 a Year, 50 Cents a Copy

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Covering the Field

- **Airport Construction**
  An $850,000 desert airport is built from scratch in 100 working days. The article reporting the job begins on this page.
- **Flood Control**
  A contract for a concrete floodwall and earth dike to protect a mill city from floods is described on page 1.
- **Public Relations**
  An article on page 1 covers in detail the set-up and activities of highway-department public relations programs.
- **Dam Construction**
  Concreting at Fort Gibson Dam (see page 2) calls for all-manufactured aggregate and precise temperature control of mixes.
- **Office Building**
  The 18-story structure described in text on page 5 and in a picture story on pages 56-57 features lightweight floors of special design and unusual windows.
- **Road Maintenance**
  In a state of varied topography and climate, roving patrols take maintenance in their stride. See page 17.
- **Concrete Paving**
  The story on page 23 tells how a new concrete road was built over a 25-year-old one for a stretch of 11.2 miles.
- **Survey Correlation**
  A way to coordinate road survey and map data to a common system of horizontal and vertical control is outlined on page 35.
- **Bridge Construction**
  Truck-mixers supply concrete for three new concrete-slab bridges built over a millpond and river. See page 38.
- **Hydraulic Road Fill**
  A high fill to carry a new highway across river bottomlands is dredged and deposited by pipe line. See page 41.
- **Bituminous Paving**
  Two courses of plant-mix repave 5 miles of 31-foot-wide concrete highway, according to the account on page 46.
- **Contractor's Shop**
  Complete shop and service facilities at Bull Shoals Dam are housed in a reconstructed airplane-repair hangar (page 50).
- **County Road Work**
  Page 60 tells how a midwest county tackles its problems despite poor soils and a low maintenance budget.
- **Road Show**
  The ARBA Road Show and 45th Annual Convention get a last backward glance of summary and evaluation—on page 65.
- **Roadside Development**
  Virginia's wayside-park program and slope seeding for erosion control are described on page 71 of this issue.
- **Low-Cost Roads**
  Page 81 tells how unspecialized pieces of equipment can be advantageously combined for low-cost road-mixing.

(You will find "In This Issue" on page 4)

Floodwalls, Dike Protect Mill City

River Floods to Be Held In Check by Concrete and Earth Barrier; Contract Includes Pump Stations

✦ THE industrial city of Holyoke in western Massachusetts is located on the west bank of the Connecticut River, within a great bend formed by that longest of New England's rivers. Battered by three major floods in 1927, 1936, and 1938, the city is now within sight of the final link in a comprehensive flood-control plan of the U. S. Corps of Engineers, to prevent a repetition of such disasters.

Part of this protection was completed in 1939-1940. It begins at the Holyoke dam, which lies across the river upstream from the lower section of the city, and extends downstream as far as Mosher Street. This section, nearly a mile long, consists almost entirely of a concrete floodwall, except for a 500-foot stretch of earth dike at the lower end. From Mosher Street downstream about ¾ mile, a high river bank affords natural protection. From the end of this high ground, which is about 600 feet above the Boston & Maine Railroad bridge across the river, a $2,057,098 contract is under way to keep the river within its bounds to a point well below the city.

Comprehensive Contract

The contract for this new work was awarded to Daniel O'Connell's Sons, Inc., of Holyoke, a firm which has done considerable work on the 4½ miles of canals that have so greatly influenced the economic growth of the city. These canals flow through the city on three different levels, and supply local manu-

(Continued on page 10)

Don't hide your light under a bushel; rather let a good public relations man reveal your service to the taxpayers.

Tell the Public The Highway Facts

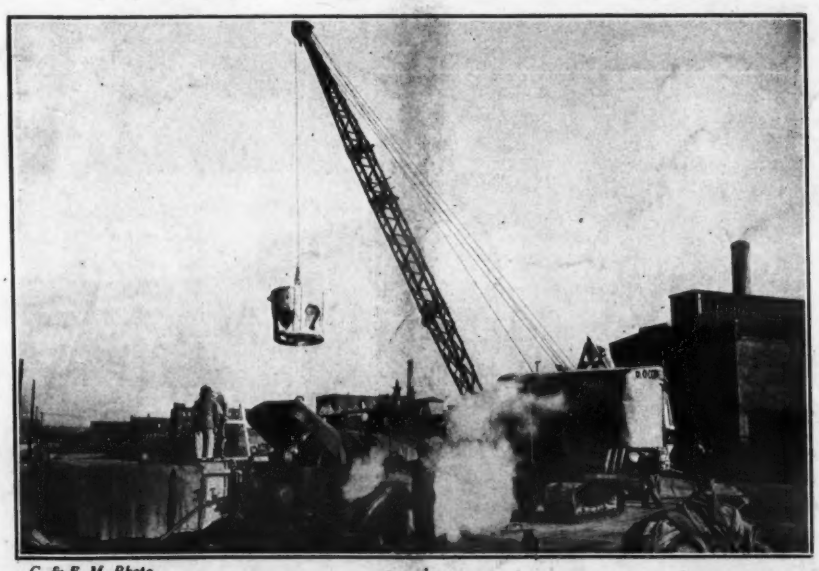
Some Suggestions on the "Why" and "How" of a Public Relations Program For Highway Departments

By OLIVE E. POTTER, Managing Editor

✦ "THERE is no more important work for the highway official than public relations", said Hal H. Hale recently, Executive Secretary of the American Association of State Highway Officials. Highway officials are recognizing more and more the validity of this statement, but there are still too many content to hide their light under a bushel.

"Public relations" is a broad term. Like "charity" it can cover a multitude of activities—and sins. Unfortunately, because the media for creating good public relations have sometimes been misused, the term has come to suggest

(Continued on page 96)



C. & E. M. Photo

Here's a view of floodwall concreting in cold weather at Holyoke, Mass. The Cleaver-Brooks heater in the foreground heats mixing water and pumps it to a MultiFoote 27-E paver. The Northwest crane is lifting a Blaw-Knox bucket to the wall forms.

Airport Is Paved In 100 Work Days

Morrison-Knudsen's Fast "Fireball" Crews Brave Desert Wind and Heat to Build Big Air Terminal

✦ WORKING against time, a crew of 125 men in the Morrison-Knudsen Co., Inc., Highway Division has built from scratch a 1,350-acre modern airport at Las Vegas, Nev. Known as the Clark County Public Airport, the new terminal was rushed to completion in 100 working days at a contract cost of $850,000. Sponsors of the big new airport were Clark County, Nevada, and the Civil Aeronautics Administration.

The short-term contract was necessary because of the sudden decision, on the part of the Department of the Army, to restrict the use of McCarran Field east of Las Vegas to military air traffic.

Las Vegas a Lusty City

Las Vegas is an individualistic city. Her people are used to the unusual, to say the least. There, where success and failure are commonplace occurrences in everyday business, Las Vegans looked on the completion of the airport as nothing out of the ordinary.

For Las Vegas is a gambling town. Situated in the southwestern part of Nevada, it is an oasis in the center of a vast wilderness of desert and shimmering heat. By day the dancing heat waves camouflage the gaudy gambling halls along the main street. By night a thousand winking lights gleam across the miles of lonely desert. All types of people mingle there in a motley combination of the cosmopolitan, the small town, and the frontier west.

Preachers call it a hellhole of iniquity. Some of the itinerants call it bonanza town. Some, with desperation and ruin showing on their faces, know Las Vegas as heartbreak town. A few know it as a normal city, and go about their business. Las Vegas boasts—and justly—of the straightest gambling, the finest schools, the best churches for miles around. It offers neither idle boast nor apology.

And, in a continual flood, visitors come to the city. They come to rid themselves of inhibition. They come for fun. They come to form their various points of view of the place in the atmosphere of whirring roulette wheels, the throw of dice, or the draw of a blackjack card.

They come by bus, by automobile, and by air. More and more they come by air from southern California, to escape the 300-mile drive through the desert. Planes of United Airlines, TWA, Western Air Lines, Bonanza and Slick Airways, as well as countless private planes, land at Las Vegas and unload their passengers. And Las Vegas, the outlet for human emotions, is growing rapidly.

During World War II, the desert east

(Continued on page 74)

All-Manufactured Aggregate Goes Into Fort Gibson Dam

Morrow-Limestone Bluff Furnishes Rock to Feed Mammoth Crusher Plant; Sand, 4 Rock Sizes Made

By RAYMOND P. DAY,
Western Editor

✦ IN Fort Gibson Dam near Muskogee, Okla., contractors are now well started on a 461,300-cubic-yard concrete job. For the first time in the history of major southwestern construction, every pound of that concrete will be made from manufactured aggregates and sand from a common source of supply. It is expected by many of the engineers on the job that the lessons learned at Fort Gibson Dam may well be valuable in future dam construction.

Fort Gibson Dam (See C. & E. M., Aug., 1947, pg. 63) is being built under the general supervision of Colonel C. H. Chorpening, Tulsa District Engineer, for the Corps of Engineers, by the joint-venture firms of Al Johnson Construction Co. of Minneapolis, Peter Kiewit Sons, Co. of Omaha, and Winston Brothers Co. of Minneapolis. Their prime contract totals $13,500,000, and includes all the dam construction but the powerhouse. The big sand-aggregate producing job is being done by M.,O. Weaver, Inc., of Des Moines, Iowa, under a subcontract with Johnson-Winston-Kiewit.

When the dam contract was first awarded, the Corps of Engineers had planned to use sand from the Arkansas River, about 10 miles by rail southwest of the dam. But this material proved unsuitable in combination with crushed-limestone coarse aggregate. After some delay, the decision was made to manufacture all sand. However, the practical difficulty of finding a source of supply soon arose, because preliminary studies showed no sizable deposits of suitable material.

Extensive borings were then made by the Corps of Engineers with the cooperation of the M. O. Weaver crews, and finally a suitable limestone deposit was found about 4½ miles east of the dam site. The material was Morrow limestone, and tests indicated that it would make concrete more durable than any that had yet been seen in eastern Oklahoma.

"Go" Order Leaves Little Time

The decision to go ahead with the present quarry and rock-production job was not made until April 16, 1947, and with the decision went the stipulation that full production capacity of 250 tons an hour be reached by August 1. This left little time—only about 90 days—to design the plant, purchase equipment, erect the plant, and start operations.

George C. Hawkins was engaged in the capacity of Consulting Engineer on the big job. Assisted capably by General Superintendent L. H. Peterson, Weaver's representative at the job, he plunged immediately into the enormous task. Peterson had already formed two main ideas, based on his past experience

(Continued on page 28)

Ice Holds Temperature Of Concrete Aggregates To 56 Degrees on Big Batch and Mixing Plant

✦ TEMPERATURE regulation of concrete mixes at Fort Gibson Dam is the other precise control measure required by Corps of Engineers specifications. By using ice in hot weather and steam in cold weather, concrete temperatures of from 50 to 60 degrees are maintained.

According to engineers in charge of the work, control of the placing temperature of concrete will reduce its cooling time from what it normally would be if hot sand and aggregates were used at summer temperatures.

The concrete set-up at Fort Gibson Dam includes storage facilities, conveyors, batching plant, compressor house and refrigeration equipment, three automatic tube-ice machines, four 2-yard mixers, transfer equipment, gantry-mounted cranes, and other units.

Methods of temperature regulation can best be detailed by telling of the equipment and its use in the proper chronological order, as the concrete materials flow through the plant.

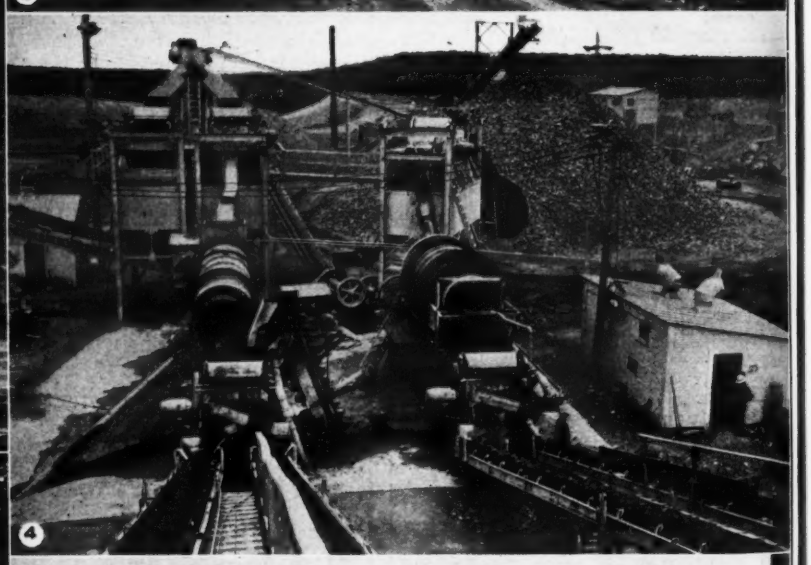
Aggregate Storage

As sand and coarse aggregate arrives at the dam from M. O. Weaver's manufacturing plant, trucks and bulldozers place it in five huge piles. Altogether, about 65,000 tons of material is stored at all times there. Coarse aggregate is dumped conveniently, and then pushed short distances by an International TD-18 tractor and Bucyrus-Erie Bullgrader.

Sand storage is a little more elaborate. It must be, because of segregation of the sand particles. Trucks dump to a steel feeder hopper, and a 24-inch Goodrich belt conveyor 150 feet long transfers the material to a trestle-mounted stacker. This stacker rolls on the rails atop the trestle, and sand can be discharged all along the pile. To minimize segregation

(Continued on page 89)

C. & E. M. Photo
An American Revolver gantry-mounted crane swings a 4-yard bucket of concrete at Fort Gibson Dam.



1. Three Ingersoll-Rand wagon drills, powered by two truck-mounted I-R 500-cfm compressors, drill an upper bench at the limestone quarry which was opened up to provide concrete aggregate for Fort Gibson Dam. 2. Two P&H shovels, standing in rainwater on the quarry floor, load the broken stone to two Dumptors which will haul it to the aggregate plant. 3. M. O. Weaver, Inc., which subcontracted the big sand-aggregate producing job, designed and set up this Cedarapids crushing and screening plant for a production rate of 250 tons an hour. 4. From the head tower of the plant, looking down, we see the aggregate belt conveyors in the foreground, scrubbers and plant layout in the rear. 5. And from high up on the batch plant, Fort Gibson Dam looks like this. *C. & E. M. Photos*

Massachusetts specified

Asphalt Macadam

for this superhighway

South Dakota specified

Sand Asphalt

for U. S. Route 80

MASSACHUSETTS—Heavy-duty construction was employed on this 4½-mile section of the Concord-Westminster Highway. It consisted of a 12-inch gravel sub-base, 4½-inch sand filled broken stone foundation and 2½-inch Texaco Asphalt Macadam wearing surface. Kelleher Corporation of Turners Falls, Mass., was general contractor. Lake Asphalt & Petroleum Company of Greenfield, Mass., applied the asphalt.

SOUTH DAKOTA—In paving 14 miles of U. S. 18, east of Martin, a Texaco Sand-Asphalt mix was laid in two courses, 2½ and 1½ inches thick when compacted. Supporting the Sand-Asphalt is a 6 inch sand clay stabilized base. The contractor on the project was the Northwestern Engineering Company of Rapid City, S. D.

These Massachusetts and South Dakota projects help bring out an important fact for road builders. They demonstrate once again the versatility of Texaco Asphaltic products in solving the nation's varied highway problems.

Massachusetts constructed Texaco Asphalt Macadam, using the Penetration Method. South Dakota laid a plant-mixed Texaco Sand Asphalt pavement.

On the other hand, New Jersey has used hot-mixed, hot-laid Texaco Asphaltic Concrete for years. Texaco Sheet Asphalt has been laid extensively over worn-out pavements and new foundations. Colorado has surfaced a large mileage of roads with low-cost Texaco Asphalt construction of the Road-mix type. Double and triple Surface-treatments with Texaco serve many miles of Texas highways.

Detailed descriptions of all these and other types of Texaco Asphalt construction are presented in two helpful booklets. Interested road builders may obtain copies without cost by writing to our nearest office.

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REG. T. M.

TEXACO ASPHALT

Contractors and Engineers Monthly

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For the Highway and Heavy-Construction Industry

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Don't Gamble on Winter; Get Set for It

The specter of Old Man Winter is already haunting highway engineers and contractors. Not even hot summer suns have dispelled the memories of last winter in particular, with its unprecedented snows, alternate freezing and thawing, damage to highways, and delays to contractors who were trying to work on a year-round schedule.

Though none of us can do anything about the weather, we *can* do something about what the weather does to us. And the first step is to prepare for it. That means lining up plans for the winter work ahead, assessing equipment and material needs, and placing orders immediately.

For highway departments, the job ahead is well defined—to keep the highways open and safe for winter travel and to protect them as much as possible against damage. This requires, first, a complete overhaul of snow-removal and ice-control equipment—plows, trucks, tractors, graders, sanders, heating and thawing units, etc. New machines and necessary parts must be ordered *at once,* so that the equipment will be ready *before* the battle with winter begins. Abrasives for ice control must be stockpiled at strategic points, with ample supplies of calcium chloride or salt laid in for the winter's needs. Roadsides must be mowed and ditches cleaned, to prevent drifting and ensure proper drainage during the winter months. Snow fence must be erected.

Consideration for employees' welfare, working conditions, and safety, raises questions like these: Are tractors and other units equipped with all-weather cabs to protect operators against storms and cold? Are trucks and other automotive equipment provided with windshield defrosters, chains, etc., to aid in safe driving? Do all snow-plow units and sanders have flashing lights in good working order?

Finally, the job ahead means studying the maintenance efforts of previous winters, their problems and difficulties. Were there weak spots in maintenance organization? If so, what type of reorganization will correct them? What about drifting? Was enough snow fence set up, and in the real trouble spots? Are those trouble spots different this year because of changes in topography, land-clearing, etc.? What about the use of radio communication with mobile units? Highway departments employing it report increased equipment and operator efficiency when close contact with the scenes of action can be maintained via two-way radio.

With motor travel on a steady increase, winter maintenance becomes a bigger job every year. Handling it calls for all the ingenuity and efficiency which highway officials can muster—and all their vigilance and adaptability to changing conditions.

Contractors, too, have their winter problems—some similar, some quite different. If they are handling jobs which they hope to carry on through as much of the winter as possible, they, too, need to take stock of their needs *now.* What about an adequate supply of heaters, salamanders, and tarpaulin for enclosing winter jobs? What about steam generators, engine pre-heaters, anti-freeze, and all-weather cabs for tractors and other equipment? When the snow flies or the temperature drops below freezing, it is too late to ask.

The highway and heavy-construction industry is today confronted with the enormous task of meeting modern traffic requirements and catching up on the backlog of needed construction. Careful planning and organization, preparation for the winter problems ahead, selection of proper equipment in ample time, can keep our highways open and much of our construction moving ahead on a year-round schedule.

So don't gamble on weather this winter; be ready for it.

Urges Tax-Diversion Halt

National and state action to halt diversion of highway-user taxes to purposes other than highways was urged following a meeting of the Administrative Committee of the National Highway Users Conference in Washington. Albert Bradley, Chairman of the NHUC, announced figures showing that highway taxpayers in the nation have lost 95,313 miles of roads in the last 13 years due to diversion of $2,038,460,000.

AGC Surveys Outlook For U. S. Construction

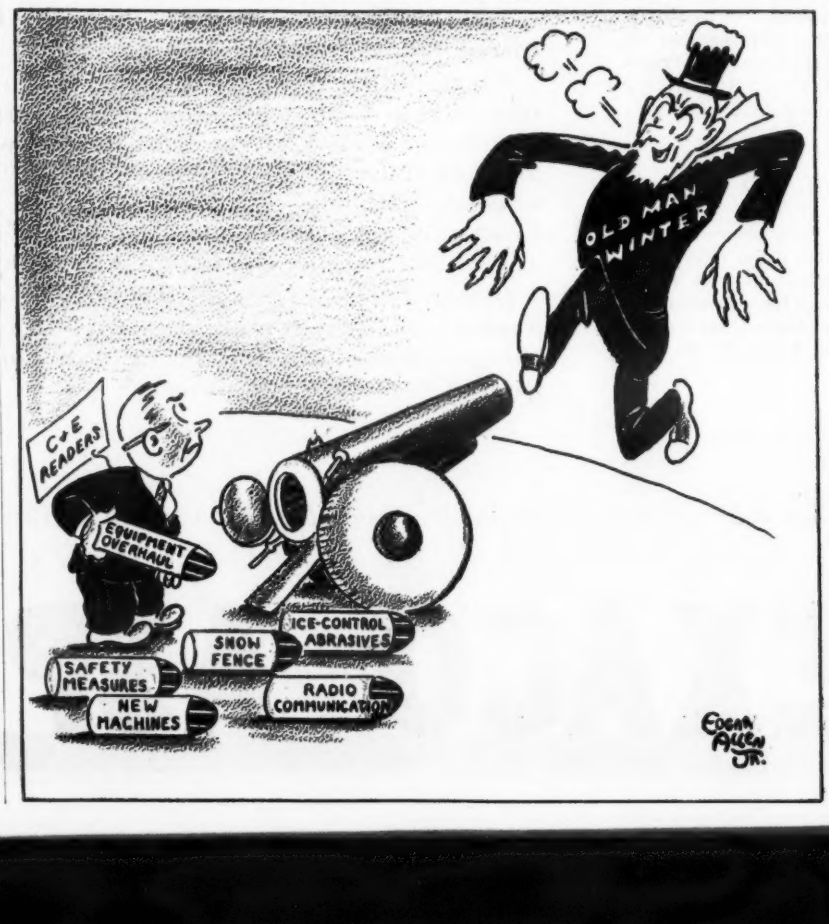
According to a recent telegraphic survey of its members by the Associated General Contractors of America, Inc., costs in the construction industry are tending to stabilize at or near present levels. Replies to the survey also indicated that (1) material and equipment supplies are improving or ample in many areas; (2) there are more workmen available; (3) contractors are demanding and getting firm prices on most materials; and (4) there is a sustained volume of work.

Heavy-construction chapters and directors of the AGC reported slight cost increases. But many cited as a reason the fact that projects have progressed from preliminary phases of site preparation to advanced construction. Upward costs trends were also noted by those in the highway and building fields, but one out of every five replies indicated that cost stabilization has been achieved.

Heavy construction seems to be the most affected by material shortages—perhaps, again, because projects started since the war are reaching more elaborate stages of construction and are requiring large, sustained supplies of materials. But only 37 per cent of the highway-construction chapters reported shortages—as compared to 55 per cent in a similar survey last September. And only 25.5 per cent of the building chapters noted material shortages—compared to 83 per cent last September. These shortages seem to be confined almost exclusively to steel and cement.

As for construction equipment, 47.5 per cent of the highway contractors reported shortages (down from 55 per cent last September), and 41 per cent of the heavy-construction contractors (50 per cent last September). Only 23.5 per cent of the highway contractors and 27 per cent of the heavy contractors reported man-power shortages (36 and 40 per cent respectively last September)—principally of skilled equipment operators. Well over half the replies indicated that firm price commitments are again the practice for all materials, or for all materials except steel and cement.

Around 45 to 47 per cent of the highway and heavy-construction representatives and 63 per cent of the building-construction chapters reported an increase in volume of work. Work volume is not increasing more rapidly in highway and heavy construction, the survey indicates, because substantial Federal and state programs were launched last year and are being carried to completion at a high level. But this high volume of work is expected to continue for an indefinite number of years.



Plans Are Announced For Safety Congress

The Construction Section of the National Safety Council has announced the program planned for its sessions at the National Safety Congress to be held in Chicago next month. Meetings of the Construction Section will be held afternoons on October 19 and 20, at the Hotel Stevens.

With the objective of making these meetings of practical help to safety engineers and contractors in achieving greater job safety, the feature of the first session will be a panel discussion on how to plan a construction job for safety. Participating will be Joseph A. DeLuca, in charge of safety for the Construction Division, E. I. du Pont de Nemours & Co.; Gerard O. Griffin, Safety Director, Dravo Corp.; and F. C. Wardwell, of Stone & Webster Engineering Corp.

The importance of proper equipment maintenance to safety and job efficiency will also be discussed at this meeting. Frank J. Cadin, Eagle-Globe-Royal Companies, will be the speaker.

"Accidents on Trial" is the subject for an interesting pictorial presentation and analysis of a series of typical construction accidents, scheduled for the October 20 session. The moderator will be George B. McCeney, National Surety Corp., and those discussing the cases from the points of view of the contractor, the safety engineer, and the claims attorney will include Charles A. Davis, General Superintendent of Construction, E. B. Badger & Sons Co. of Boston; J. A. Sweeney, of the New York staff of H. K. Ferguson Co.; and Joel Blomquist of Employers Mutual Liability Insurance Co.

The closing talk will be on the subject "Why Do People Resist Safety in Construction?", by Art Matthias, of the Wisconsin Vocational School System. Those attending last year's session will remember Mr. Matthias' human and practical approach to the emotional and psychological factors in accident prevention.

In addition to the Construction Section meetings, there will be general sessions of interest to all concerned with safety problems during the Congress period October 18-22. And, as usual, there will be an exhibit of all types of safety equipment and materials.

The Construction Section's Executive Committee urges contractors, whether members of the Section or not, to attend. New ideas on planning safety into the job will help lower job costs, and improve the construction industry's safety record.

New Office Building Has Modern Features

18-Story Structure Has Trim Appearance as Well As Functional Design; to House Steamship Company

By WILLIAM H. QUIRK,
Eastern Editor

(*Photos on pages 56 and 57*)

✦ WHEN the Waterman Steamship Corp. moves into its new home in Mobile, Ala., this autumn, it can say without boasting that it has one of the most modern office buildings in the south—or the whole country for that matter. For the design of the 18-story structure, while purely functional, gives it a new look that is unusual and pleasing. This effect is produced in many ways—perhaps the most obvious of them, at first glance, is the neat exterior window shutters on the three open sides of the building. They are refreshingly different in their eye appeal, yet are of great utility in keeping the direct rays of the sun from the offices.

Other modern innovations in the construction of the building, while they may not even be apparent, are none the less of comparable importance. For instance, the lightweight cellular steel floor, now covered over, which is designed to lessen floor loads. Or the use of that new building material, vermiculite concrete, which is laid on top of the cellular steel as a floor insulation. Or the double-window glass panes separated by a ½-inch dehydrated air space. Or the complete air conditioning of the building, and the recessed apertures in the hung ceilings for the fluorescent lighting system.

These are but a few of the many modern features incorporated in the new Waterman Office Building by its builder—J. P. Ewin, Inc., Engineers and General Contractors, of Mobile, Ala. The estimated cost of construction is $3,500,000. Work on the project started in February, 1947, and is scheduled for completion this month.

Skyscraper in Mobile

Formerly, the Waterman Steamship Corp. and its subsidiaries had offices either in the Merchants National Bank Building or scattered around Mobile. These concerns will be the sole occupants of the new skyscraper, which is about the same height as the Merchants National Bank Building on the opposite side of St. Joseph Street. The new Waterman Office Building is located at the southwest corner of St. Michael and St. Joseph Streets in downtown Mobile. It is rectangular in shape with an 85-foot front on St. Michael Street to the north, and 65 feet fronting on St. Joseph Street to the east. During the construction, St. Michael Street was closed to vehicular traffic in front of the building in order to give the builders a narrow strip of working space, and to provide room for the delivery of construction materials.

The ground floor will be given over to the public sale of steamship tickets and accommodations. In the lobby there will be a 12-foot revolving terrestrial globe, which will have one-third of its height depressed below floor level. The walls will be decorated with murals. Adjoining the office building on St. Joseph Street is a new two-story restaurant with a 35-foot front and 85 feet deep. In design and construction it is similar to the office structure. Across St. Michael Street is the U. S. Post Office.

The site of the new building was formerly occupied by some old four-story buildings which were razed to provide room for the new construction.

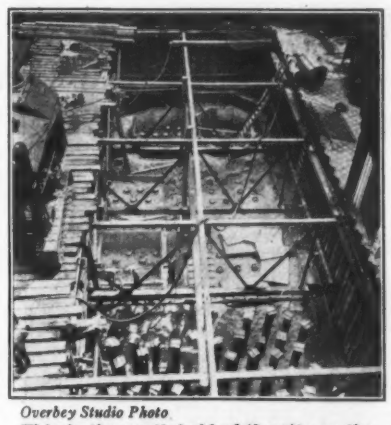
Foundation

An enclosure of steel sheet piling was first driven around the building site, 10 feet outside the building line and to a depth of 50 feet below grade. Excavation then proceeded within the sheeting, with a crane and clamshell bucket working from a narrow timber trestle. As the hole deepened, the sheeting was braced on the inside with steel H-beams from 18 to 27 inches deep. The wales were set 4 to 5 feet apart vertically as the hole was deepened by that amount of cut each time. A Moretrench wellpoint system was installed to keep the excavation dry.

For the foundation, 437 Union Metal Monotube fluted tapered piles were driven an average depth of 25 feet into firmly compacted sand. Jetting was used to help the driving. The 14-inch-diameter piles were then filled with concrete. At the western end of the site the cut-off was 4 to 5 feet lower than the rest of the piles because of the location of the elevator pits. The westerly three-fifths of the site has concrete pile-cap footings constructed in clusters, while the foundation for the easterly two-fifths is of concrete mat and steel I-beam construction up to 9 feet thick.

Structural-Steel Framework

Structural steel for the framework of the building came from the Ingalls Iron Works Co. of Birmingham, Ala., and was erected by a subsidiary, the Steel Construction Co., also of Birmingham. Steel erection started on June 10, 1947, and was topped out on December 1, 1947. The concrete walls for the basement were still being poured as the steel was going up. Altogether 27 columns were erected, with the greater concentration at the west end near the elevators. The heaviest member at the base of one of the columns is a 14-inch 426-pound H-beam, with a 30-pound channel section on each side.

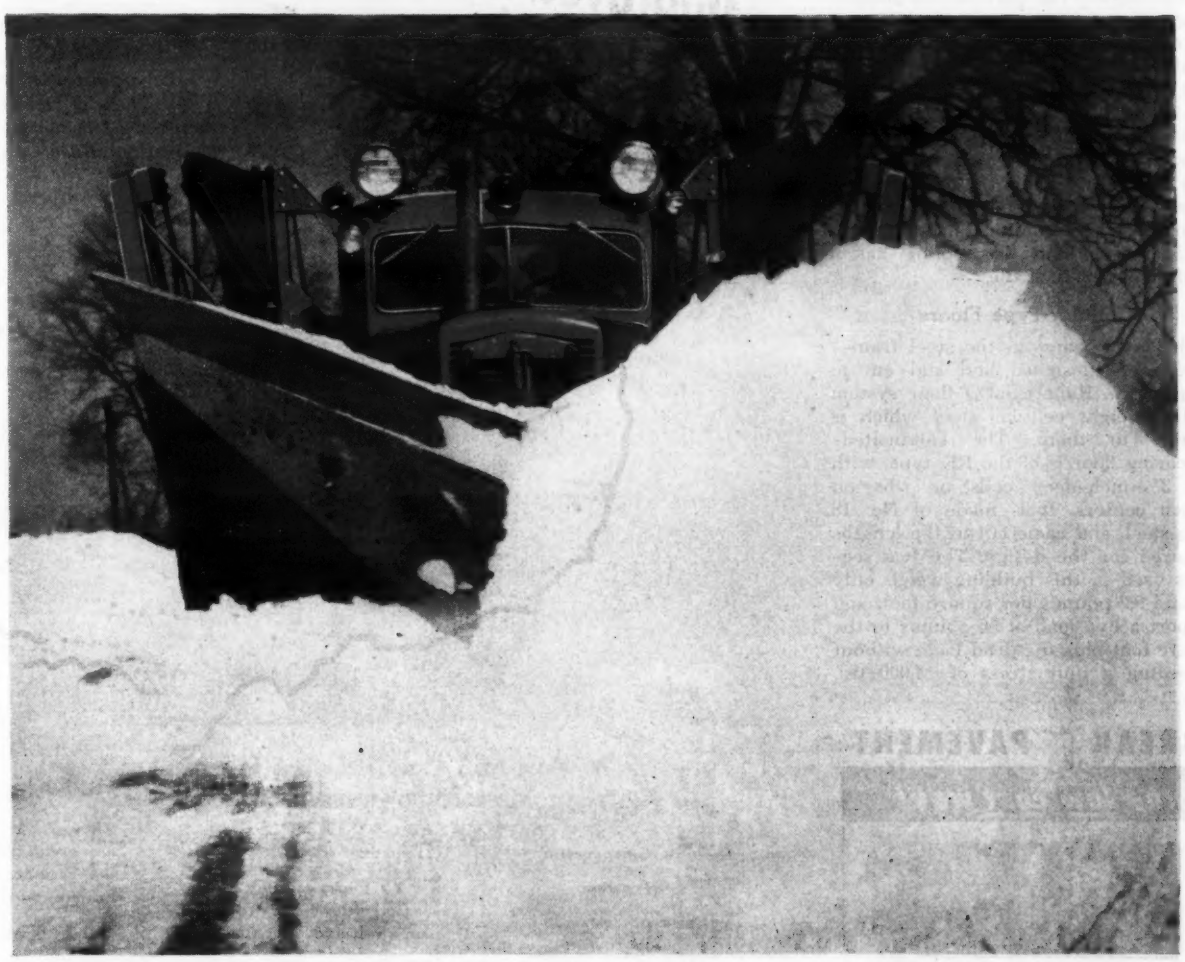


Overbey Studio Photo
This is the south half of the site on the Ewin building job, looking east. The west part of the foundation has concrete pile-cap footings constructed in clusters; the east is of concrete mat and steel I-beam construction up to 9 inches thick.

(*Continued on next page*)

AGAIN THIS WINTER

MORE FWD TRUCKS MOVING MORE SNOW



WHEN winter throws its snow blockades across field and highway, more FWD trucks will be clearing more snow than all other makes of four-wheel-drive trucks combined... keeping highways open for traffic. 52 State and Provincial Highway Departments, and more than 800 counties, own and operate FWD highway trucks.

The ruggedness, four-wheel-drive "going-power" and traction on all wheels, make FWD trucks America's No. 1 snow fighters. Snow removal demands heavy-duty truck performance at its best — and that's what you get from FWD four-wheel-drive and six-wheel-drive heavy-duty trucks.

Whatever your heavy-duty truck needs may be, you can depend upon FWDs to go more places, do more work, at less cost . . . all year 'round!

See your nearest FWD Distributor or write for complete information.

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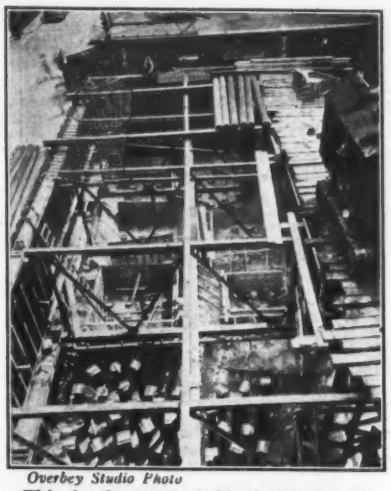

Overbey Studio Photo

This is the north half of the site for the Waterman Office Building, looking east. Some 437 Union Metal Monotube fluted tapered piles were driven and filled with concrete for the foundation. Note the steel sheet piling which encloses the excavation, and the crane working from a timber trestle.

New Office Building Has Modern Features

(Continued from preceding page)

Erection was done by a guyed derrick with an 80-foot vertical mast and an 80-foot boom. The derrick was hopped upward every two stories. All steel members are connected by rivets. A total of 1,500 tons of structural steel was used in the building.

All beams, columns, connections, braces, brackets, and other steel members are fireproofed with premolded clay tile, fabricated to fit the members on which they are used. The beam fireproofing is a minimum of 2-inch tile, while the column fireproofing has a minimum of 3-inch tile.

Cellular-Type Floors

The floor beams in the steel framework were designed and laid out to support the Robertson Q floor system of lightweight cellular steel which is welded to them. The corrugated-appearing floor is of the RK type, with the 3⅛-inch-deep cells or ribs on 6-inch centers. It is made of No. 18 gage steel, and came cut in the lengths required for the design. The two sections used in this building weigh only 7.4 and 9.2 pounds per square foot, and support a live load of 50 pounds to the square foot plus the dead load, without exceeding a unit stress of 18,000 psi.

Besides possessing the characteristics of lightness and great strength, the Q floors with their cellular ribs are suitable for electrical and telephone-wire distribution, the cells acting as ducts for all the wiring required in the building. As soon as they are laid in place and welded to the beams on 12-inch centers, they provide a safe, solid working platform. They also support the hung ceiling on the floor below. Connections to lights, telephones, etc. are easily made simply by pushing the wires along through the cells, and boring a hole through the light steel wherever an outlet is needed.

Lightweight Concrete

The development of the little-known mineral ore vermiculite has permitted the further lessening of floor loads in the Waterman Office Building. It is used in the production of a lightweight concrete which is laid 2 inches thick above the top of the cells in the Q floor. After it has been exposed to heat and expanded, vermiculite weighs only 6 to 8 pounds per cubic foot as compared with sand weighing about 100 pounds a cubic foot—hence its use as an aggregate where lightweight concrete is desired. In this floor fill work, cement and vermiculite were mixed in the proportions 1 to 3 and supplied in paper bags under the trade name Zonolite.

Zonolite, as well as all the concrete mortars and plasters used in the building, was furnished by the Radcliff Gravel Co., Inc., of Mobile. The company made delivery either in truck-mixers or, in the case of the mortars, in dump trucks. This saved mixing on the job, in the heart of the city, where working space was distinctly limited. Materials were raised to the proper floor levels in a two-compartment hod hoist constructed of steel tubing. The 240-foot-high tower is along the St. Michael Street side of the building. The cages are raised by a Clyde two-drum hoist powered by a G-E 20-hp motor.

The lightweight concrete was screeded with a 1-inch pipe screed supported by adjustable chairs and holders in order to get the exact depth required. For better wearing quality, the Zonolite floor was topped the following day with a ⅝-inch surface of ordinary concrete. This was a 1 to 2½ mix of cement and aggregate, the latter graded from ⅛ to ⅜ inch. The monolithic topping was given a steel-trowel finish. Later all the so-called rental area, of which there is 3,600 square feet on each floor excluding the elevator lobby, was covered with a Goodyear rubber-tile floor 3/16 inch thick.

Brick and Stone Walls

The windowless west wall, against which the bank of elevators is set, is 8-inch face brick of an unusual dark color tinged with red. It is a pleasing contrast to the buff-colored architectural stone on the other three sides. The severity of the all-brick west wall is offset by decorative bands of architectural stone extending the full height of the building. The brick is backed with structural load-bearing clay tile.

(Continued on next page)

TO PROVIDE more effective coverage, better service and additional technical assistance in the use of hard-facing alloys, Stoody Company announces certain changes in its distributor organization. The accompanying list contains the names of principal distributors throughout the United States and Canada.

IN ADDITION TO THESE DISTRIBUTORS, *local dealers in industrial and agricultural areas handle Stoody products. For the name of your local dealer, write or phone the distributor nearest you.*

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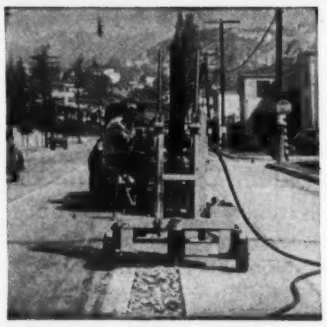

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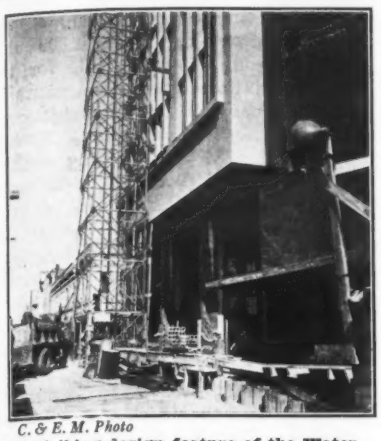

C. & E. M. Photo

A striking design feature of the Waterman Steamship Corp. Office Building in Mobile, Ala., is a 4-foot overhang along part of the north side immediately above the ground-floor lobby. Notice the opalescent granite encasing the lobby-floor columns—also the material-handling hoist tower of steel tubing.

The insides of all the exterior walls are dampproofed with Par-Lock, sprayed on with an air gun.

The architectural stone on the north, south, and east sides is a reinforced cast stone made with white portland cement, using granite and silica for the aggregate. Coloring is obtained with the selection of different granites for aggregate. The blocks are 4 inches thick and average 30 square feet in area. Difficulty in getting an adequate supply of the material was probably the chief bottleneck in the construction of the tall office building. Two firms furnished the stone: Mabie Bell Co. of Greensboro, N. C., and Granux Corp. of Chicago, Ill. The stone is backed and anchored to common brick.

Stone-setting got under way in November, 1947, before the structural-steel framework was completed, but progress was slow because of the uncertain deliveries. The 8-inch brick backing proceeded simultaneously with the stone-setting. To raise the stone from the ground to the desired floor level, a tripod-type stiffleg derrick with a 40-foot boom was set up on the roof. This rig had a capacity of 4 tons at a 28-foot radius. Lifting was done with a Clyde hoist powered by a Waukesha gas engine.

A striking feature of the design is a 4-foot overhang along part of the north side of the building immediately above the ground-floor lobby. There the heavy steel columns are encased with opalescent granite. The interior wainscoting of this floor is a rainbow granite from the Cold Spring Granite Co. of Cold Spring, Minn. The marble floor and walls of the elevator lobby were fashioned from Tennessee marble supplied by the Appalachian Marble Co. of Knoxville, Tenn.

Structural clay tile, similar to that used in the furring or backing of the stone and brick walls, was used for dividing walls between the rental areas and the elevator lobby on each typical floor, and in toilet spaces. The 3,600 gross feet of rental area on each floor will be subdivided by Hauserman enameled metal collapsible partitions.

Windows

The rental floor areas are well lighted, with eight windows on the east side of each floor and twelve windows on the north and south sides. They are grouped closely together, separated by fins or mullions of coral-colored architectural stone, beginning at the second floor and extending through the sixteenth floor of the building. The lintels and exterior framing are also coral-colored. Made of aluminum alloy, the Sealuxe Thermo windows are windproof, weatherproof, and dustproof. They are equipped with two panes of Pittsburgh polished plate glass, ¼ inch thick, hermetically sealed with a metal-to-glass bond, and separated by a ½-inch dehydrated air space. They are equipped with outside sunshades.

Windows on the east and south sides of the building, which get the full brunt of the hot sun during the long summers in the Deep South, are protected with Universal venetian-blind-type aluminum metal shades. They are painted with Alrok No. 4 finish to eliminate glare. The shades are raised or lowered from the inside by means of a crank and worm-gear mechanism.

The windows on the north side are separated by vertical fins, and also have an 8-inch-deep fixed vertical shade at the center of each window. This shade design was carefully thought out and planned. While the full rays of the sun strike the shuttered east and south sides and the solid west wall of the building all through the year, the north side escapes these direct rays except around June 21 when summer officially arrives. At that period the western sun creeps around to cast its heat waves on the northern elevation also. But the fins and the vertical shades project just far enough from the building to catch these rays and prevent them from shining on the glass windows.

Thanks to this ingenious arrangement of shades, shutters, and thermo-pane glass, the air conditioning of the building is more efficient and also more

(*Concluded on next page*)

C. & E. M. Photo

J. P. Ewin, Jr. (left), son of the builder, was Engineer on the Waterman Office Building job. Ross H. Boas, at right, was General Superintendent.

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Compaction of soils is simply a process of removing air voids and moisture by pressure and vibration. The Cedarapids Compactor does this by combining a heavy rubber-tired roller with a vibrating mechanism which greatly increases the compactive effort of the static load of the unit. The soil is pushed right straight down with a minimum of lateral displacement. On actual jobs, where specified densities *could not be obtained* with regular compaction units, a Cedarapids Compactor quickly produced the desired density. Whether compacting highway subgrades and bases, airport runways or dam fills, stabilizing soil cement or soil and graded aggregate—a Cedarapids Compactor will do it better and at lower cost. Offered in two sizes for a wide variety of jobs. Winter is coming soon—Will you be through with your soil compaction work? If not, get a Cedarapids Compactor on the job NOW. Write today for Bulletin COMP-2 for complete details.

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New Office Building Has Modern Features

(*Continued from preceding page*)

economical to operate. In fact, a saving of 50 tons of air-conditioning equipment was made on the original installation by reason of this unusual device for shielding the windows from the heat rays of the sun while admitting natural light to the offices. Such devices have been used in modern building construction in some large South American cities that are subjected to the continual heat of the sun, but they are new to this country. Yet Mobile, a Gulf Coast port, experiences high temperatures through the greater part of the year from early spring to late autumn as do her Latin neighbors to the south. So these unique building features are as applicable to Alabama as they are to Brazil.

Air-Conditioned Throughout

The Waterman Office Building is air-conditioned throughout with Carrier equipment operating in two separate systems. Conditioning equipment which covers the system from the ninth floor down is housed in the basement, while that for the upper half of the building is located on the seventeenth floor. The vertical fins and mullions of coral-colored stone stop at the fifteenth floor and above that is a 4-foot overhang. The sixteenth is the highest occupied floor, and is glass-enclosed on the north and south sides, with adjacent slate-surface terraces. There are the offices of the President and other top-flight tycoons of the Waterman Steamship Corp. The seventeenth and eighteenth floors carry machinery and equipment for servicing the building. A water-cooling tower for the air-conditioning apparatus extends through these two upper floors. Water for the building is pumped up to a tank on the eighteenth floor.

Air ducts for the air-conditioning system are fed to each floor through the dropped center portion of the hung ceiling. This center zone, 6 inches lower than the rest of the floor, occupies two bays or 800 square feet. The remainder of the floor is serviced by Carrier Weathermasters, placed under window stools covered by enameled metal facing with grilles. The distance from the finished floor to the ceiling in this area is 8 feet 10 inches.

During the winter, heat is supplied to the system by two oil-burning boilers located in the basement next to the machine room. The double panes of glass in the windows then serve to retain the heat in the building, and operate towards greater economy in building maintenance.

Light and Sound

Each floor is lighted by 130 fluorescent lights, with two tubes contained in the 1 x 3-foot recesses built into the suspended ceiling. They are spaced evenly so that no matter what pattern of partitions may be adopted for any one floor, the individual offices will always be assured of adequate overhead lighting. The same is true of the air-conditioning system.

To reduce the periods of reverberation and to secure better acoustical effects, the central dropped-ceiling area is covered with ½ inch of Macoustic, a fireproof gypsum acoustical plaster. This is put on in two ¼-inch coats over the plaster. The remainder of the ceiling around the outer bays is covered with 12 x 12-inch x ⅝-inch-thick blocks of Acousti-Celotex, an acoustic tile cemented to the plaster ceilings.

The tall building is serviced by four American gearless passenger elevators, 7 feet wide x 5 feet 6 inches front to back. Each lifts 3,000 pounds plus the weight of the car, and can travel at the rate of 700 feet per minute. Three elevators go from the first to the sixteenth floor, about 188 feet, while the fourth runs from the basement to the sixteenth floor, or 203 feet. A freight elevator, 4 feet 4 inches x 6 feet, travels from the first floor to the basement. The passenger-elevator doors in the lobby are of bronze.

A temporary work elevator was installed in one of the elevator hatches as soon as possible to carry workmen, small tools, and less bulky materials between the floors. This helped to ease the burden of the stone mason's derrick and the hod hoist tower.

Quantities and Personnel

A few of the larger material items going into the building included the 1,500 tons of structural steel; 1,600 cubic yards of reinforced concrete for the piles, foundations, and basement walls; and 425 cubic yards of lightweight concrete for the fill over the Q flooring.

The design of the building was by Platt Roberts & Co., Architects, with A. B. Benson and O. W. Long, Associate Architects of Mobile, and R. S. Christiansen and Reg F. Taylor, Consulting Engineers, of Houston.

J. P. Ewin, Inc., Engineers and Contractors, was represented on the construction of the Waterman Office Building by Ross H. Boas, General Superintendent, and J. P. Ewin, Jr., son of the late President of the firm, as Engineer. Carl E. Woodward is Vice President of the company in charge of building construction. An average force of 215 men was employed on the project.

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You will notice that the new Ateco dozer is inside-mounted. Purpose of the design is to remove dozer stresses from track and engine frames, improve visibility, and balance the dozer to the tractor. A front-mounted Hydreco hydraulic pump operates the dozer.

Bulldozer's Feature Is Inside Mounting

An inside-mounted bulldozer for use with International Harvester TD-14W and TD-18W tractors is now being manufactured by the American Tractor Equipment Corp., 9131 San Leandro Blvd., Oakland 3, Calif. The inside mount is designed to remove dozer stresses from track and engine frames; to reduce wear on track rails, wheels, and idlers; to improve visibility; eliminate loose-fitting working parts and brush-catching elements; and to permit better balancing of the dozer to the tractor.

The dozer is operated by a front-mounted Hydreco hydraulic pump with the cylinders acting directly on the dozer arms. According to the manufacturer, the blade will lift 48 inches above the ground, and will drop to 12 inches below it. The blade will travel vertically at a rate of a foot per second. Multiple valves—either single, dual, or triple—are available for operating the dozer and pull-type implements.

Direct push and thrust loads are taken through the trunnions and the transmission-case tie-rods. The trunnions are bolted to the transmission case by sixteen ⅞-inch cap screws cross-braced to the swinging drawbar casting. Bowl level is independent of the track frame movement. The dozer bowl is removable to permit the use of other front-mounted equipment.

The Ateco dozer has a cutting edge of 7 feet 11¾ inches, a bowl height of 36 inches, and a total unit length of 13 feet 6 inches. It weighs 4,350 pounds. An optional radiator guard has a hinged face-plate to facilitate radiator cleaning.

Further information may be secured from the company, or by using the enclosed Request Card. Circle No. 47.

Buckets for Dragline Use

Three types of dragline buckets are described in a recent bulletin of the Hendrix Mfg. Co., Mansfield, La. They are the lightweight Type LS; the medium-weight Type TS; and the Type HS heavy-duty bucket.

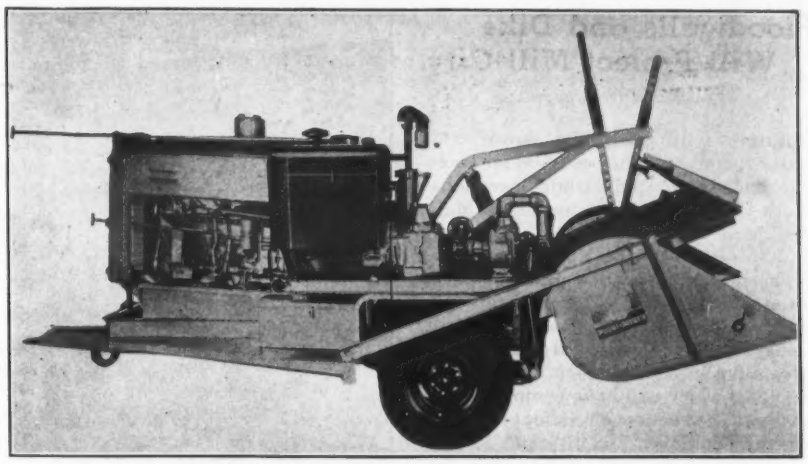
The bulletin lists six general features claimed for these buckets, and devotes a page to the specific duties and performance features of each type. It stresses the use of cast manganese steel in the manufacture of Hendrix buckets, and shows where this alloy is used. The folder also tabulates the sizes in which each bucket is made and lists the weight and dimensions of each.

Copies of this literature may be obtained from the company. Or use the enclosed Request Card. Circle No. 21.

Rotary Soil Mixer Is Diesel-Powered

A new diesel-powered Pulvi-Mixer was displayed at the ARBA Road Show by Seaman Motors, Inc., 305 N. 25th St., Milwaukee 3, Wis. The Pulvi-Mixer is described as a rotary mixer designed for soil-stabilization and soil-cement operations on highways and airports. The new diesel-powered mixer is equipped with spray bar, pump, tachometer, and scarifier. Water or oil is piped to the unit from a supply truck operating either directly behind or at the side of the mixer.

The spray bar is located just ahead of the mixing rotor in such a way that oil or water is applied a fraction of a second before it is taken into the mix, the manufacturer states. As a result, Seaman explains, migration or evaporation losses are virtually eliminated, and greater efficiency is obtained.



A new diesel-powered Pulvi-Mixer, equipped with spray bar, pump, tachometer and scarifier, is announced by Seaman Motors, Inc.

The scarifier attachment is designed to loosen soil exactly to specified subgrade depths. It is said to provide assurance of uniformity in depth of treatment, especially in soil-cement or other soil stabilizations.

Further information may be secured from the company, or by using the enclosed Request Card. Circle No. 32.

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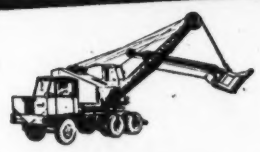

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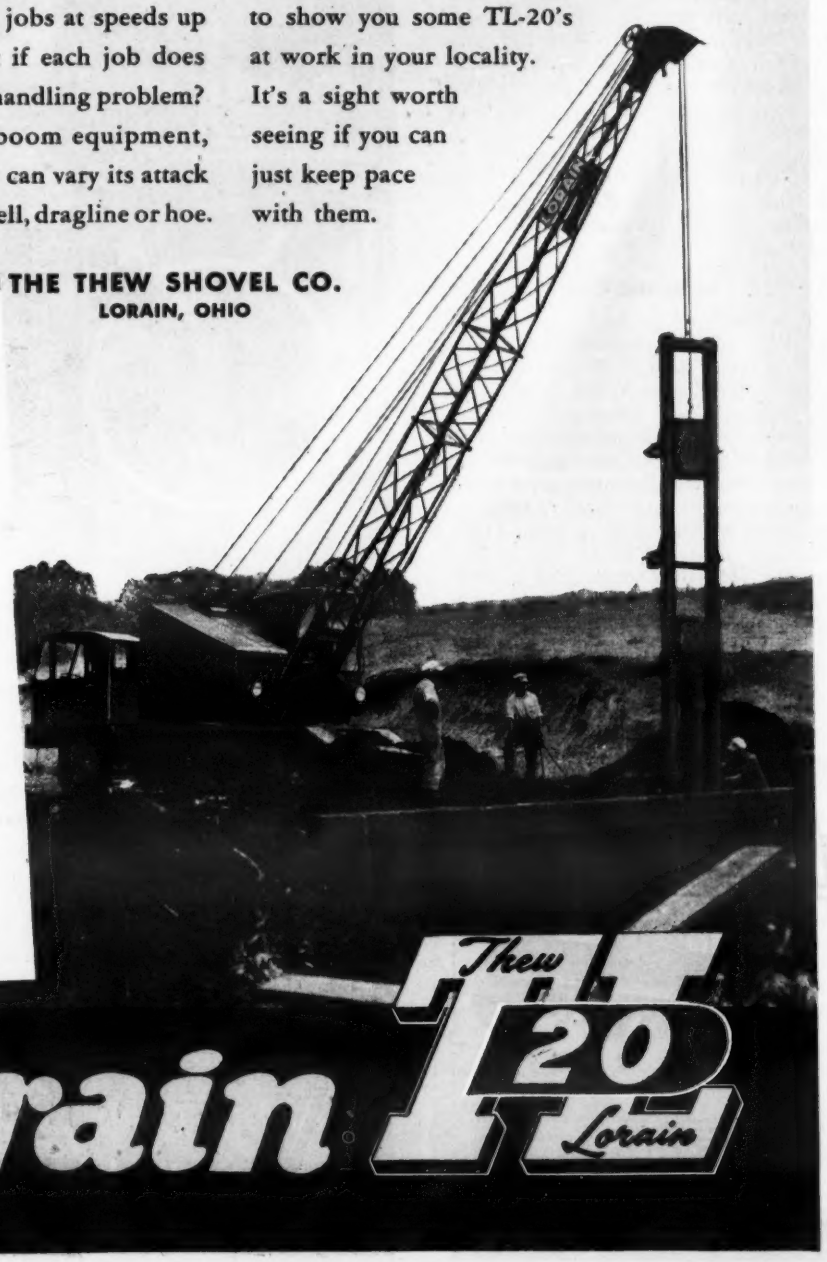


Lorain Thew TL-20 Lorain

Floodwalls and Dike Will Protect Mill City

(*Continued from page 1*)

facturers with hydraulic power and water for process purposes, or for cooling and other industrial operations. Work on the contract began in May, 1947, and is scheduled for completion in January, 1949.

The project is divided into two parts —the South End section and the Springdale section. It totals 7,800 feet along the river, and extends downstream far enough to reach high ground so that the city will have complete protection. The sections are about of equal length. The South End or upper section is concrete wall throughout, and also includes two pumping stations, No. 5 and No. 6, behind the wall. This wall continues for 500 feet into the Springdale section, but there an earth dike picks up and continues to the end of the contract. The Springdale pumping station is located behind the mid-point in this earth embankment.

Between the No. 5 and No. 6 pumping stations is a waterway through which the third and lowest-level canal empties into the river. Included in the contract are new floodwalls extending up this waterway on both sides to the third-level canal. The walls also extend along the sides of the third-level canal as further protection to the low-lying industrial area of the city. These additional waterways are over 3,500 feet long.

Thus the contract includes 3,800 linear feet of earth dike along the river; 4,000 linear feet of reinforced-concrete river wall; 7,500 linear feet of reinforced-concrete canal wall; 3 pumping stations; 5 intake and 5 tailrace structures complete with gates and hoists, together with stop-log structures; and steel sheet pile cut-offs. With the construction of these new walls, the drainage system in that part of the city also required considerable alterations, and such major changes are included in the project. Sewers were redesigned and rebuilt where the floodwalls cut them off. They now flow to the new pumping stations, and from there discharge into the river.

Industrial City

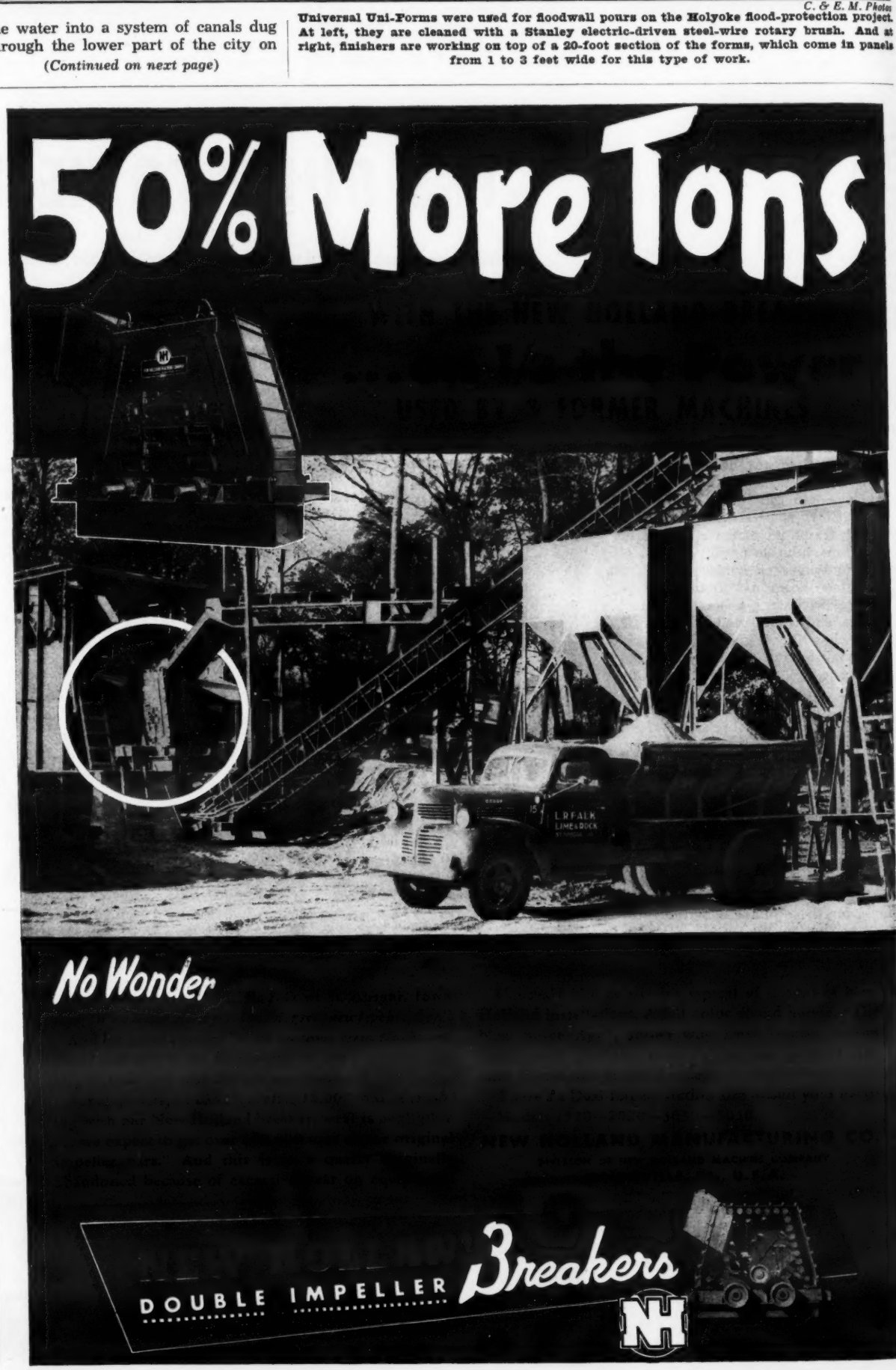
To understand better the importance of such a protection-works project to this thriving industrial city of some 56,000 population, a quick briefing on the canal system is necessary. Just before the Connecticut makes its big bend around Holyoke, the river falls 60 feet within 1,000 feet. Engineers were quick to recognize the importance of this water power which was being wasted over the falls. Just 100 years ago, in November, 1848, they constructed a 1,000-foot dam above the falls. This dam was fashioned from hemlock timbers riveted to bedrock, had a height of 30 feet, and was faced with boiler plate.

The purpose of the dam was to divert the water into a system of canals dug through the lower part of the city on

(*Continued on next page*)

C. & E. M. Photos

Universal Uni-Forms were used for floodwall pours on the Holyoke flood-protection project. At left, they are cleaned with a Stanley electric-driven steel-wire rotary brush. And at right, finishers are working on top of a 20-foot section of the forms, which come in panels from 1 to 3 feet wide for this type of work.



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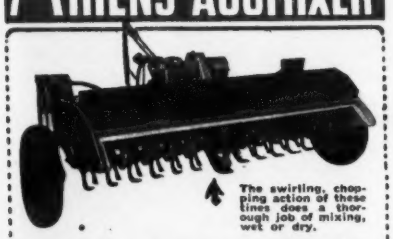

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C. & E. M. Photo
This McKiernan-Terry No. 7 hammer drives a deadman section of four 19-inch-section steel sheet piles, 15 feet long, as part of the Holyoke flood-protection job. The hammer is suspended from the 65-foot boom of a Bucyrus-Erie 41-B steam crane.

three different levels. The water behind the dam entered the first-level canal through a gate. Along the banks of this upper-level canal the engineers envisioned a row of mills which would receive the water through their raceways and use it to turn the mill wheels. The discharge would collect into a lower, or second-level, canal, from which it could flow through another parallel row of mills and raceways to a third or lowest-level canal. Before the water was finally returned to the river, the hydraulic head which it still possessed was to be used still a third time to serve the mills along the river bank. The total length of this remarkable hydraulic canal system is 4½ miles.

The ingenious and difficult scheme of utilizing the water power of the river met with reverses at the start. Developing leaks, the original dam finally gave way and was washed across the river to pile up on the shores of the little town on the opposite bank. The construction engineers' succinct report to the Boston capitalists who financed the project read, "Dam gone to Hell by way of Willimansett".

But new entrepreneurs entered the scene to develop this basically sound engineering idea. The Holyoke Water Power Co., which still owns and controls the water power, built a new dam and attracted diverse industries to the banks of the canals. Paper mills predominate to such an extent that Holyoke is sometimes called the "paper city", for the waters of the Connecticut are especially soft and prove excellent for paper making. They are also good for textile processing, and many textile mills were set up in Holyoke along with cotton, wire, machine-tools, and mill-equipment mills, to mention but a few of the industries making use of the river water.

Concrete Flood Walls

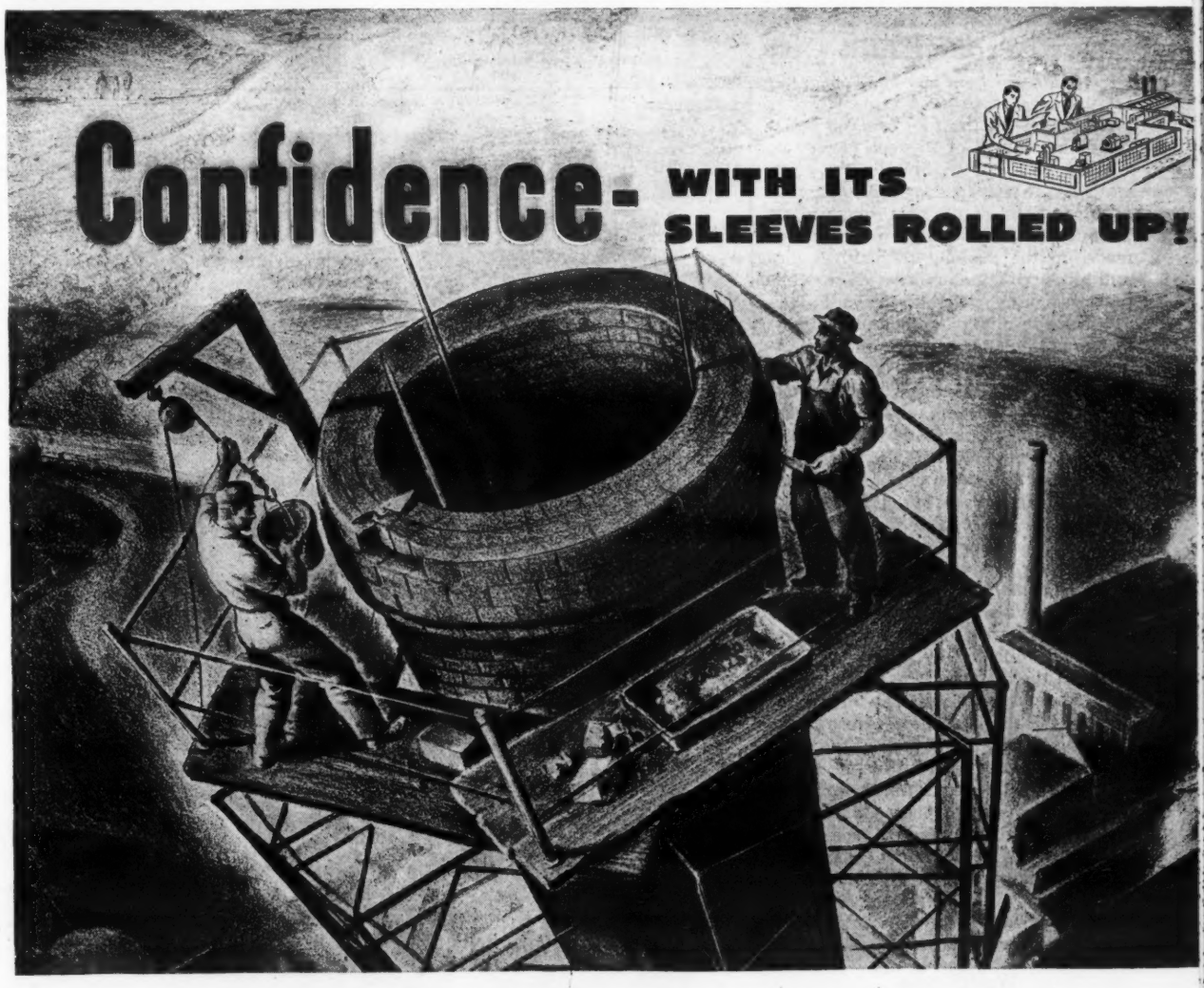
Consequently the importance of this flood-protection project to life and property in the industrial area of Holyoke cannot be overemphasized. True, the existing walls that had been constructed along the lower waterway of canals emptying into the river gave a measure of protection. But the waters of this level are kept at 65, and these walls were built only to elevation 66—affording only a one-foot margin of safety against a rising river. The new canal walls go up to elevation 74, while the river wall has a maximum elevation of 75.1 and drops gradually with the fall of the river.

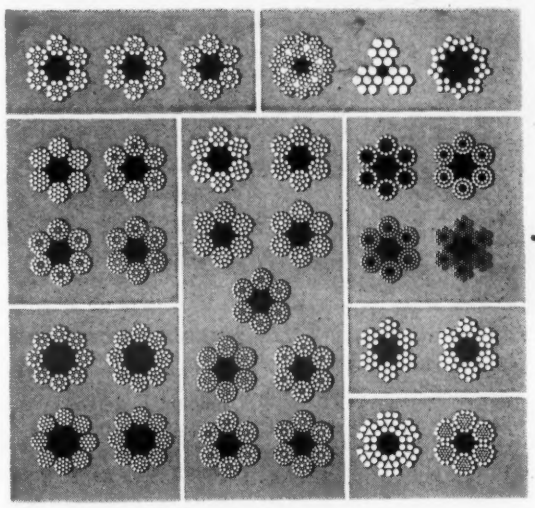
Practically all the conerete walls are the cantilever type, except for a few short stretches along a portion of the third-level canal where vertical gravity-type wall sections were built. Where the canal walls are less than 7 feet high, they are built without a footing. Over 7 feet, the walls are supported on a footing 18 inches thick with a maximum width of 12 feet 6 inches. The walls have a uniform thickness of 18 inches. The maximum height of the canal walls is 12 feet, and as the height decreases the footings become narrower.

The river walls vary in height from 3 up to 23 feet, depending on the topography, and are 18 inches thick at the top. They are supported on concrete footings which are usually 18 inches thick at the ends and 30 inches at the center under the wall. At the front or river side of the footing, seepage under the wall is minimized by a row of steel sheet piling driven into the ground and projecting 15 inches into the concrete. Bethlehem Steel Co sheeting, shipped from Lackawanna, Pa., was used, having a width of 19⅝ inches and a weight of 36 pounds to the foot. The length of piles varied according to the soil conditions, the longest sheeting on the job being 41 feet. The width of the concrete footings also differed with the underlying strata. In some cases where the wall was built

(*Continued on next page*)

C. & E. M. Photo
O'Connell's organization lines up for inspection: left to right, Equipment Supervisor David Allen, Timekeeper Bill O'Connell, Superintendent Joe Beausoleil, Roger Williams (not of O'Connell's clan, but Corps of Engineers Concrete Technician), Timekeeper James Sullivan, Office Engineer Bob Fischer, Supervisor George O'Connell, Cost Engineer Tom Argy, and Assistant Cost Engineer Bill Rogers.





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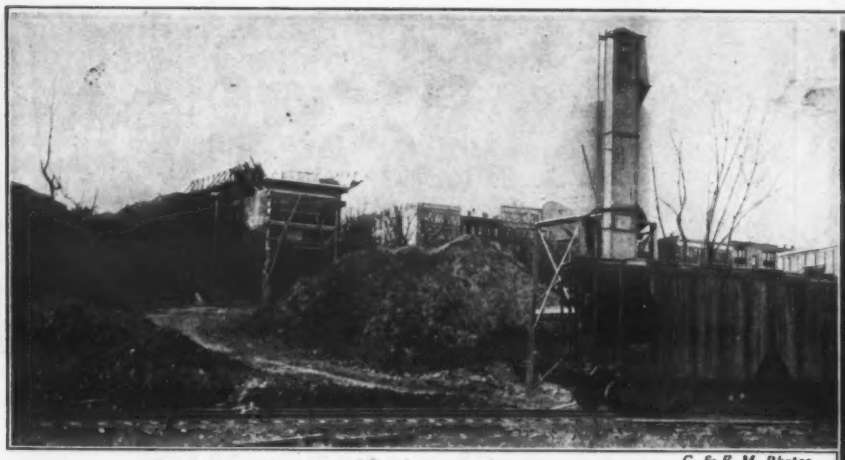

C. & E. M. Photos

O'Connell's Sons batch plant for the Holyoke job includes a Butler 225-barrel cement bin (in the foreground of the picture above), and an Erie AggreMeter erected alongside a hill (background of the same picture). At right is a view of Moretrench operations at the site of the outfall conduit of the Springdale pumping station.

Floodwalls and Dike Will Protect Mill City

(Continued from preceding page)

on a made fill, the footings reached a maximum width of 27 feet.

Work was started first on the canal walls which were pretty well completed by the end of the first year's work. Throughout last winter, progress was made on the drainage structures, but nothing was done on the river walls until this past spring. All the wall pours are made in alternate 20-foot sections; the concrete is placed in 18-inch lifts.

Driving the sheet pile cut-offs continued through the colder weather, using a Bucyrus-Erie 41-B steam crane with a 65-foot boom and McKiernan-Terry hammers, either a No. 7 or a 9B3. To construct a section of river wall that extended 600 feet above the B. & M. RR bridge, the contractor faced the problem of holding a spur track in position while excavating to a depth of 9 feet alongside it for the wall footing. First he drove a row of sheeting 13 feet deep bordering the track on the wall or river side, followed by another row of piling on the opposite side of the track, and 15 feet away from the first row. Steel 14-inch H-beams were laid lengthwise along the outside of the piles nearest the river as a stiffener. From these beams, tie-backs in the form of ⅞-inch wire cables were passed under the track and fastened to the back sheeting every 15 or 20 feet. The slack was taken up with 2-inch turnbuckles. The double row of sheeting thus tied together prevented any shifting of the track during wall construction.

Wall Forms

The walls are poured in 20-foot-long monoliths in alternate sections with a pilaster every 40 feet. V-joints are constructed at the end of each section, and there is an expansion joint every sixth section where the wall is on a tangent, and every second section where the alignment is curved. Universal Uni-Forms are used in all the pours in widths of 1, 2, or 3 feet and in various heights; the average panel is 2 x 8 feet. They are made of wood, 13/16-inch stock, backed by steel angles on 1-foot centers both ways. The overall thickness of form, both wood and metal, is 2⅝ inches. The average 2 x 8-foot panel weighs 85 pounds.

Holding the opposite forms together are spreaders made of ¾-inch-wide strap steel, spaced on 2-foot centers both vertical and horizontal. Before they are set the spreaders are well lubricated with Marfak No. 5 grease so that they can be pulled out of the concrete more easily when the forms are removed. The spreaders are perforated with holes through which 30-penny nails are passed at the back of the forms, thus keeping the panels in true alignment.

When the forms are taken off, from 48 to 56 hours after a pour, the ends of the spreaders are broken off on the water side of the wall. The spreaders

(Continued on next page)

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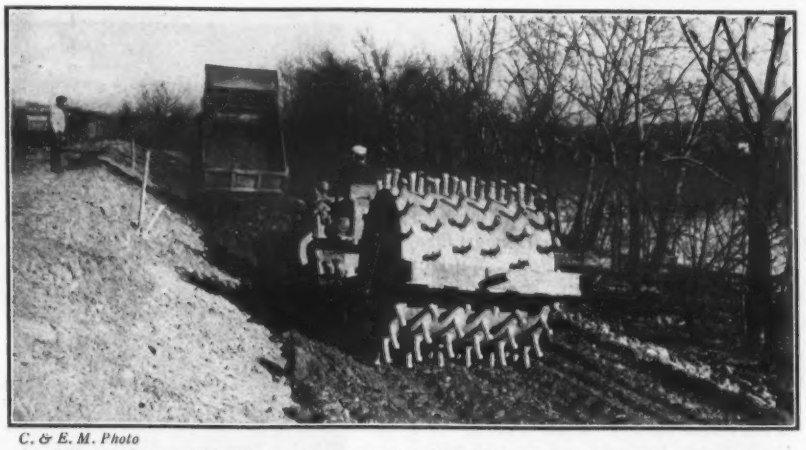
themselves are pulled out from the land side of the wall with a special extractor. The holes are then filled with grout from a hand pressure gun.

The wood face of each panel is thoroughly cleaned with a Stanley electric-driven steel-wire rotary brush powered by a Le Roi generator. During this cleaning the worker protects his eyes from chips or particles with large goggles. The forms are then given a coating of oil and assembled for another pour. After they are erected they are braced with vertical 4 x 4 posts on 5-foot centers, and with 2 x 6's jammed against the earth bank or cut. The 2 x 6's are also placed on 5-foot centers, one against the bottom of the wall and another close to the top.

Batch Plant

A concrete batch plant was set up in Holyoke near a siding of the New Haven railroad, and about ½-mile average haul from the job. The plant consists of an Erie 3-compartment 40-ton AggreMeter and a Butler 225-barrel cement-storage bin. The latter is loaded with Nazareth portland cement from bulk cars on the adjacent siding by means of a worm gear under the track and an enclosed elevator. The cement is shipped from Nazareth, Pa.



C. & E. M. Photo

An Autocar dumps 5½ yards of clay on the riverside slope of the new earth-dike section at Holyoke. An International TD-9 tractor with a Bucyrus-Erie blade is leveling the clay and compacting it with a McCoy 6-ton sheepsfoot roller pulled along behind.

Two sizes of traprock for the coarse aggregate are supplied by the John S. Lane & Son quarry in Westfield, Mass., while sand for the fine aggregate comes from the Construction Service Co. at North Wilbraham, Mass. All the aggregate is delivered by truck after an average haul of 12 miles. The AggreMeter was erected alongside a hill so that the bins could be filled directly from the trucks on top, thereby eliminating the need for a crane.

From two to four batch trucks, holding two batches each, pick up their loads at the plant by first backing under the AggreMeter for the sand and stone, and then driving under the other bin for the cement. Darex AEA is also added at the same time with the sand, 250 cc for each 1-yard batch of Class B concrete which is used in the floodwalls, and 300 cc for the other structures poured with Class A concrete.

During the winter, the sides of the AggreMeter were closed in with boards covered by tar paper, and a long tarpaulin hung down in front to be moved only to admit a truck. The top of the bin was also covered with tarpaulins, and a heater was placed inside beneath the bottom of the bins.

The Mix

One-yard batches are used in the mix, 5½ bags of cement to the yard. The saturated surface weights of a 1-yard batch of Class B concrete used in the walls are as follows:

Cement	517 lbs.
Sand	1,171 lbs.
Stone, ½-inch	826 lbs.
Stone, 1½-inch	1,535 lbs.
Water, 33 gallons	275 lbs.
Total	4,324 lbs.

The gradation of the fine and coarse aggregate is as follows:

Sieve Size	Per Cent Passing		
	Stone, 1½ to ½-Inch	Stone, ½ Inch to No. 4	Sand
1½-inch	90-100	....	....
1¼-inch	70-85	....	....
1-inch	45-65	....	....
¾-inch	25-40	....	....
½-inch	0-10	100	....
⅜-inch	....	50-70	....
No. 4	....	0-5	95-100
No. 8	....	....	80-90
No. 16	....	....	55-75
No. 30	....	....	30-60
No. 50	....	....	12-30
No. 100	....	....	3½-10

Concreting

Water for the mix comes from city hydrants through a 2-inch hose to the pavers, which mix the concrete right at the wall section being poured. Two MultiFoote 27-E single-drum pavers handle all the mixing. For cold-weather pours the water first passed through a Cleaver-Brooks steam generator heater which raised its temperature to above 200 degrees F before pumping it along through another 2-inch hose to the paver. The concrete is discharged into Blaw-Knox buckets, either 1 or ½-yard capacity, and lifted to the forms by either a Northwest crane with a 45-foot boom or a Lorain truck crane with a 40-foot boom.

Reinforcing steel for the job is supplied by the Bethlehem Steel Co. and trucked to the project from Boston. As the concrete is placed in the forms, it is vibrated by a Jackson hydraulic vibrator, and built up in 18-inch lifts. The tops of the walls are hand-finished and floated. During the warm weather the concrete is cured with water. In the winter the forms were heated by steam coils and covered with blankets and tarpaulins immediately after a pour. Later, when the forms were removed, the concrete was cured with Klearcure compound.

In building the pumping stations, the form work and methods of handling the concrete were similar to the wall work. At the Springdale station, water was encountered when excavating for the outfall conduit around elevation 38, for the river at that point is at elevation 40. The water was overcome by installing a Moretrench wellpoint system consisting of 150 feet of 6-inch header pipe hooked up to an 8-inch vacuum pump. Risers 20 feet long went down about 16 feet into the ground by jetting with

(*Concluded on next page*)

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Guard your valuable equipment against rust this easy, inexpensive way. Get *Texaco Rustproof Compound* or *Texaco Rustproof Compound (Spray)* from the nearest of the more than 2500 Texaco Wholesale Distributing Plants in the 48 States, or write The Texas Company, 135 East 42nd Street, New York 17, N. Y.

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Floodwalls and Dike Will Protect Mill City

(*Continued from preceding page*)

the vacuum pump. The valves on the header pipe were on 34-inch centers but a riser was attached to only every other one, making them 5 feet 8 inches on centers.

Earth Dike

Of the 3,800 feet of earth dike, about 1,800 feet was entirely of new construction. The rest involved moving a former dike, constructed by WPA, back further from the river and building it to a greater and stronger cross section. This former dike withstood the 1938 high water, the second highest of record, but was close to failure at that time and the cause of no little concern to flood-fighting forces. The new dike which got under way last year is located about 200 feet back from the river at the lower end where it ties in to high ground. It gets nearer the water at the upper end where it joins the concrete wall.

The embankment is about 20 feet high, with an average crest elevation of 75 feet. The crown is 10 feet wide and the side slopes are 2½ to 1. On the river side is a cut-off trench at the toe of slope, 8 feet wide and 10 feet deep, beyond which is a 70 to 80-foot berm. The slopes and the berm are covered with 6 inches of topsoil and then seeded. On the land side is a perforated-pipe toe drain about 4 feet deep. Random fill was used in the construction except on the river side where a 5-foot blanket of impervious material was placed on the slope.

Work on the dike got under way in the summer of 1947 with the site being stripped to a depth of a foot. The old WPA dike was moved back to provide material for the random fill, and additional pervious material was obtained from two sand pits and three gravel pits, with hauls ranging up to 6 miles. For short hauls averaging 500 feet around the dike and for the stripping, the contractor used a couple of LeTourneau 12 and 14-yard Carryalls pulled by Caterpillar D8 tractors. For the longer hauls a shovel and three 14-yard bottom-dump Euclids were used for distances up to ¼ mile.

The sand and gravel pits were worked by a Lorain ½-yard truck crane and a Buckeye ¾-yard shovel, respectively, loading to a fleet of 20 trucks hired by the hour and carrying from 5 to 6 yards to the load. The impervious material, a sticky clay, came from a pit in West Springfield, 4 miles away, where it was loaded to the trucks by a Koehring ¾-yard shovel.

The embankment was built up in 6-inch lifts, with seven tractor-dozers available for spreading the material—four Caterpillars, three D7's and a D8; and three Internationals, two TD-9's and a TD-6. Two 1,000-gallon water tank trucks kept the lifts wet as they were rolled with sheepsfoot rollers to meet the requirements of a modified Proctor 100 per cent compaction at optimum moisture. This usually meant six passes with the roller. Seven McCoy 6-ton sheepsfoot rollers were on the job, and these were hooked together in various combinations. A D8 tractor usually pulled three of them in tandem, or a Euclid would pull a pair, or a single drum might be towed behind one of the smaller tractors that was spreading the fill with its dozer blade.

Quantities and Personnel

The major items included in this flood-control project are the following:

Excavation	120,000 cu. yds.
Borrow	63,500 cu. yds.
Embankment fill	105,000 cu. yds.
Steel sheeting	195,000 sq. ft.
Perforated vitrified-clay pipe, 4 to 24-inch	13,040 lin. ft.
Reinforced-concrete pipe, 21 to 48-inch	2,050 lin. ft.
Concrete	18,000 cu. yds.
Steel reinforcement	2,327,000 lbs.
Structural steel	197,000 lbs.

Daniel O'Connell's Sons, Inc., is employing a force of between 150 and 170 men on the Holyoke project under the direction of Joe Beausoleil, General Superintendent; Bob Fischer, Office Engineer; and Oscar LeSiege, Job Superintendent.

For the U. S. Corps of Engineers, D. L. McKechnie is Resident Engineer, assisted by Edwin Wanne. Herbert Gray is Office Engineer, and Roger Williams is Concrete Technician. The project is under the supervision of the New England Division which is headed by Brig. Gen. Raymond G. Moses with headquarters at Boston, Mass. Supervision of the project within the Division Office is exercised by Everett H. Brown, Chief, Civil Works Branch, and Carl H. Lovejoy, Chief, Operations and Construction Division.

The American Overseas Aid-United Nations Appeal for Children is trying to meet the emergency needs of millions of children in other lands. Your help will be appreciated.

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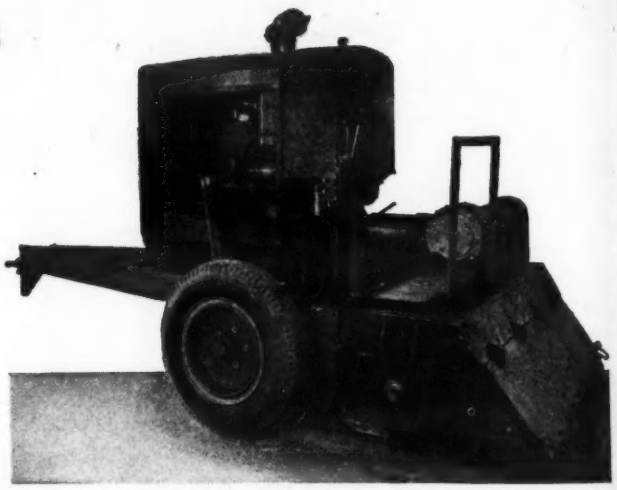

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Mounted on hydraulic jacks insuring perfect depth control makes it possible to peel off the mat and pulverize it without disturbing the road bed. Experience demonstrates its ability in conditioning all types of soils in base courses or wearing surfaces on all mixed-in-place jobs.

It is designed for towing with a crawler type tractor, and produced in two models: PT-600 which is tractor drawn and powered. Power is obtained through a standard power take-off. The P-600 is tractor drawn and has its own power plant for operation of rotor. Both machines are built 6′ in width.

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The Barco gasoline-powered rammer for compacting soils in hard-to-reach places jumps upward when the operator pushes down lightly on its handle. It drops by its own weight.

Gasoline-Driven Ram For Soil Compaction

A new portable rammer for compacting soils in hard-to-reach places is made by the Barco Mfg. Co., 1818 Winnemac Ave., Chicago 40, Ill. In operation, a slight downward push on the handles causes the unit to jump upward. It drops by its own weight. The number of jumps is controlled by the operator.

The rammer is moved in any direction by tipping it slightly. It is gasoline-powered and self-contained. Ignition is supplied by a magneto, tripped by the up-stroke of the handles. Lubrication is obtained by mixing light-grade oil with gasoline. The Model BR-2 rammer weighs 210 pounds, is 4 feet 2½ inches in height, is 15¾ inches wide across the handles, and has a 9½-inch-diameter foot.

Further information may be secured from the company, or by using the enclosed Request Card. Circle No. 99.

New Roller Sales Manager

Ralph L. Wolf has been appointed Central District Sales Manager by the Buffalo-Springfield Roller Co. of Springfield, Ohio. From his present address in Columbus, Ohio, he will cover seventeen central and southern states for the company and will assist Buffalo-Springfield distributors in that area.

George P. White and John P. Griffin, Eastern and Western District Sales Managers respectively, who formerly covered portions of the Central District, are now concentrating entirely on their special territories.

Clutch-Type Shovel Has Electric Swing

A clutch-type diesel-powered excavator is announced by the Marion Power Shovel Co. of Marion, Ohio. The Model 111-M is said to combine the advantages of Marion air control, electric swing, and diesel power. It has a 4-cubic-yard capacity. Complete details on the machine can be found in a 12-page 2-color illustrated bulletin now being distributed by Marion.

The electric swing unit consists of a vertical swing motor mounted on a gear-reduction unit. Power for the unit is obtained from a generator which is direct-connected to the General Motors Twin 6 diesel-engine power unit. The shafts are mounted on anti-friction bearings and the gears are lubricated by a circulating-oil pump. The selection of swing, crowd, or boom-hoist drive is by means of jaw clutches.

The new Marion 111-M clutch-type shovel features electric swing, Marion air control, and diesel power. It has a 4-cubic-yard capacity.

Further information may be secured from the company, or by using the enclosed Request Card. Circle No. 98.

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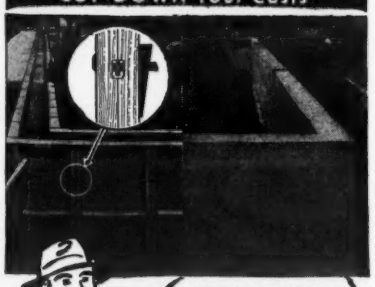

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The ¾-yard Dempster-Diggster features hydraulically operated crowd and hoist.

Light-Duty Shovel Has 3/4-Yard Bucket

A high-speed shovel unit of the front-end-loader type has been announced by Dempster Bros., Inc., Knoxville 17, Tenn. Feature of the Dempster-Diggster is its hydraulically operated crowd and hoist. Power is furnished by a 95-hp 6-cylinder gasoline engine. The bucket has a ¾-yard capacity.

The Dempster-Diggster is designed to excavate from 15 inches below ground level to 15 feet above it. It has an 8-foot 6-inch reach and a free dumping clearance of 8 feet 7 inches. Clearance to the bottom of the bucket from its highest position is 10 feet 6 inches. According to the manufacturer, finger-tip steering has been accomplished through the use of a Vickers hydraulic steering mechanism.

Further information may be secured from the company, or by using the enclosed Request Card. Circle No. 42.

Data on Snow Fighters

A 12-page catalog on the use of Sno-Flyr rotary plows for combating heavy snow storms has been prepared by the Wm. Bros Boiler & Mfg. Co., 1057 Tenth Ave., S. E., Minneapolis 14, Minn. Form No. RE-47 features the use of these units in man's fight against snow on highways, airports, as well as on other locations.

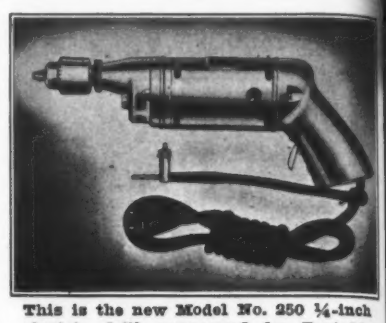
The catalog points out how the Bros Sno-Flyr develops its speed and power, and how the variable casting-and-loading chutes direct the flow of material. It describes the hydraulically powered feeder rake, the double-V design of the moldboard, and the unit's self-feeding feature. It shows these rotary snow plows mounted on various types of trucks, graders, and other equipment. And it contains a full page of general data on the Sno-Flyr models, their power units, and other information.

Copies of this literature may be obtained from the company. Or use the enclosed Request Card. Circle No. 4.

Drills in Two Sizes

New portable electric drills in ½ and ¼-inch sizes are announced by Portable Electric Tools, Inc., 255 W. 79th St., Chicago 20, Ill. Features claimed for both models include a Cutler-Hammer trigger switch, universal ac or dc 110-volt motors, and a Jacobs key-type chuck. Among the specifications listed for the ¼-inch Model 250 are a no-load speed of 1,400 rpm, full-load speed of 600 rpm, and a capacity of ¼ inch in steel and ⅜ inch in hardwood. It has an overall length of 11¼ inches, and a net weight of 3½ pounds.

Among the specifications listed for the ½-inch Model 500 are a no-load speed of 400 rpm, full-load speed of 240 rpm, and capacity of ½ inch in steel or 1 inch in hardwood. The manufacturer also states that the No. 500 will make wood augers of up to ⅞ inch, and hole saws of up to 2½ inches. It has an overall length of 15½ inches and a weight of 9 pounds.



This is the new Model No. 250 ¼-inch electric drill announced by Portable Electric Tools, Inc. Its outstanding feature is a pistol-grip handle with Cutler-Hammer trigger switch.

Further information may be secured from the company, or by using the enclosed Request Card. Circle No. 22.

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Maintenance Patrols Speed Road Repairs

Unique Problems Handled In Colorado by Roving Patrolmen and Special Bituminous Gangs

✦ EARLY this year, two state highway engineers rode through Colorado on business. As the car dropped down off a steep mountain grade, the driver neatly ducked a small pothole near the side of the bituminous highway.

"Let's phone Doug Stewart when we get to Denver and tell him to get up here and fix his roads", the driver said, grinning mischievously at the thought of this prank on D. N. Stewart, Superintendent of Maintenance.

"We'd better not", his companion said. "With the system Doug has, that hole will be fixed by the time we get to Greeley, and by the time we get to Denver, he'll already know about it. We ought to have that kind of system!"

Indeed, the system of highway maintenance in the state of Colorado is geared to the repair of road failures as promptly as this incident illustrates. For Colorado has all of the problems common to any state in the Rocky Mountain region, and more. Her highway maintenance program has come about only through a slow, painful process of development in the hard school of experience. Today, under the leadership of State Highway Engineer Mark U. Watrous and Superintendent of Maintenance D. N. Stewart, Colorado's highway maintenance is one of the most important functions of the Department. It is geared to the continually increasing highway traffic in this land of sky and mountains.

Anything can happen in Colorado in the way of weather, and it frequently does. For this reason, the Department uses the partol system. Maintenance patrolmen find road failures very shortly after they develop, or they learn to anticipate them. With the responsibility theirs, these men naturally do a better job than they would if they were organized in gangs, subject to general or specific orders.

Several special gangs are used, but for a special purpose. They do bituminous reconstruction on a somewhat larger scale than maintenance patrolmen are prepared for. In this respect they, too, are specialists, accountable for certain jobs.

Reasons for Patrol System

The physical characteristics of Colorado, perhaps more than any other cause, have influenced the development of the patrol system for road maintenance. In Colorado, the jagged Rockies rise higher than anywhere else from Canada to Mexico. The state has 27 mountain passes from 8,560 to 12,095 feet above sea level, with 15 mountain passes over 10,000 feet high maintained in passable condition the year round.

Colorado is a land of mountains and plains, of high elevations, of variations in climate. Normally thought of as an arid state, Colorado last winter had an abundance of rain, snow, and sleet, which played havoc with her highways. Highway maintenance men cannot depend on seasons with any degree of assurance, and have been known to change from hot-mix asphalt-plant operation to snow fighting in a day's time.

It is for these reasons that the Colorado Highway Department has geared its all-important maintenance operation to the patrol system. No matter what trouble arises, the men, equipment, and resources of an area are on hand 24 hours a day to deal with it. They do not have to be mustered, for they are already there.

At the present writing, 163 patrols are set up in the state. They consist of a patrolman, his helper, and routine repair equipment. The patrols of these men vary in length from 14 to 31 miles, depending on the general condition of the highway, the traffic characteristics, and snowfall. The average length of a patrol is 22 miles. Each patrolman reports directly to an assistant superintendent of maintenance stationed at the seven division offices throughout the state.

During the summer months, extra men are hired to help patrolmen, or to work in the bituminous gangs. The number of men including the normal patrol crews sometimes reaches 1,000,

(*Continued on next page*)

Each of Colorado's three special rock-crushing crews has its own small portable plant. This is a Cedarapids unit in operation north of Fort Lupton.

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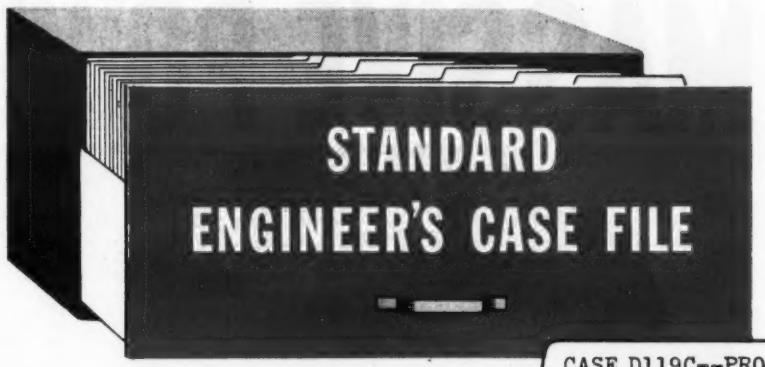

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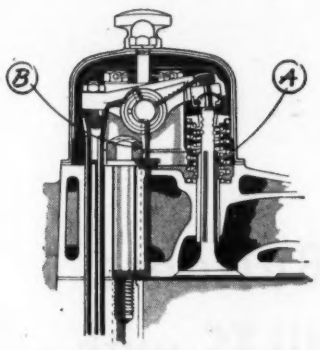

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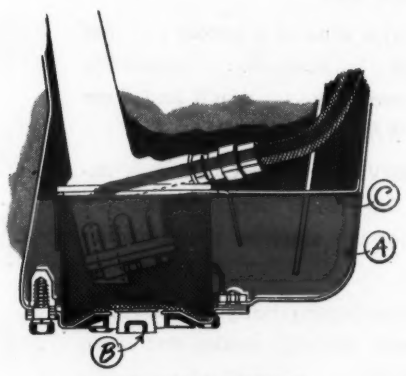

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Colorado maintenance men developed this paint rig especially for bridge painting. The platform can be raised to any height to permit the spray gun to reach the structural steel.

Maintenance Patrols Speed Road Repairs

(*Continued from preceding page*)

as it did this year during repair of extensive winter damage.

Six special bituminous-repair gangs, and three special rock-crushing gangs complete the set-up. Each gang has its own equipment, which will be described later, and works throughout the state.

All principal classified men are hired from a roster of eligibles maintained by the State Civil Service Commission. Division assistant superintendents of maintenance hire unclassified extra men when the need arises, and gang foremen usually hire their gang help.

There are 4,000 miles of primary highways, about 550 miles of concrete, 3,200 miles of bituminous highways of various types, and 250 miles of gravel. The state maintenance forces maintain only primary highways. County forces in Colorado maintain the secondary system. This year Stewart's department has a budget of $2,450,000 for straight maintenance and repair, with $1,600,000 extra for betterment work by state maintenance forces.

Concrete-Highway Problems

In the early days of highway construction in Colorado, most first-class roads were built of concrete in 16, 18 and finally 20-foot widths. The engineers of that day could not foresee the heavy axle loads which now crowd these same highways. Most of the time the concrete was laid on a 2-inch sand cushion, or no cushion at all.

The maintenance problems which are now being met on concrete highways in Colorado have evolved from this insufficiency of base and drainage. Extensive crack-pattern surveys have been made, and they prove this to be true. The most typical failures, as a matter of fact, are cracks formed by weakened subgrade, pumping joints, and settling slabs.

For quite some time Colorado did extensive Mud-Jacking work to raise pavements, and to level them out. Of late, however, many of the worn sections are being restored by a topping of asphaltic concrete, mixed and placed by the bituminous gangs. Asphaltic-concrete shoulder-widening work then brings these highways up to modern standards.

When a job of this kind is done, the concrete surface is first shot with a tack coat of RC-3 asphalt. Then the hot-mixed asphaltic concrete is brought in, dumped by trucks, and leveled true to grade by motor graders. The maintenance crews have some of the best motor-grader operators in the state, who take pride in turning out good work. For that reason the finished "second decks", after being rolled, are almost as smooth as if they had been laid by mechanical spreaders.

When bituminous work is going directly from the hot-mix plant to the road, MC-3 asphalt is ordinarily used in the mix. Patch material to fill along the edges is usually made with SC-3.

Cold-weather crack pouring and maintenance of shoulders and ditches make up the balance of the maintenance work on concrete highways.

Bituminous-Highway Repair

With such a preponderance of bituminous construction in the state highway system, it is natural that the majority of maintenance work should be directed towards asphaltic roads. Maintenance problems on bituminous roads are, in fact, quite similar to the ones on concrete highways. For after the early concrete era, it was realized that all-weather roads must be developed rapidly. Many early roads of bituminous construction were laid on inadequate bases too, and today these sections present serious problems.

(*Continued on next page*)

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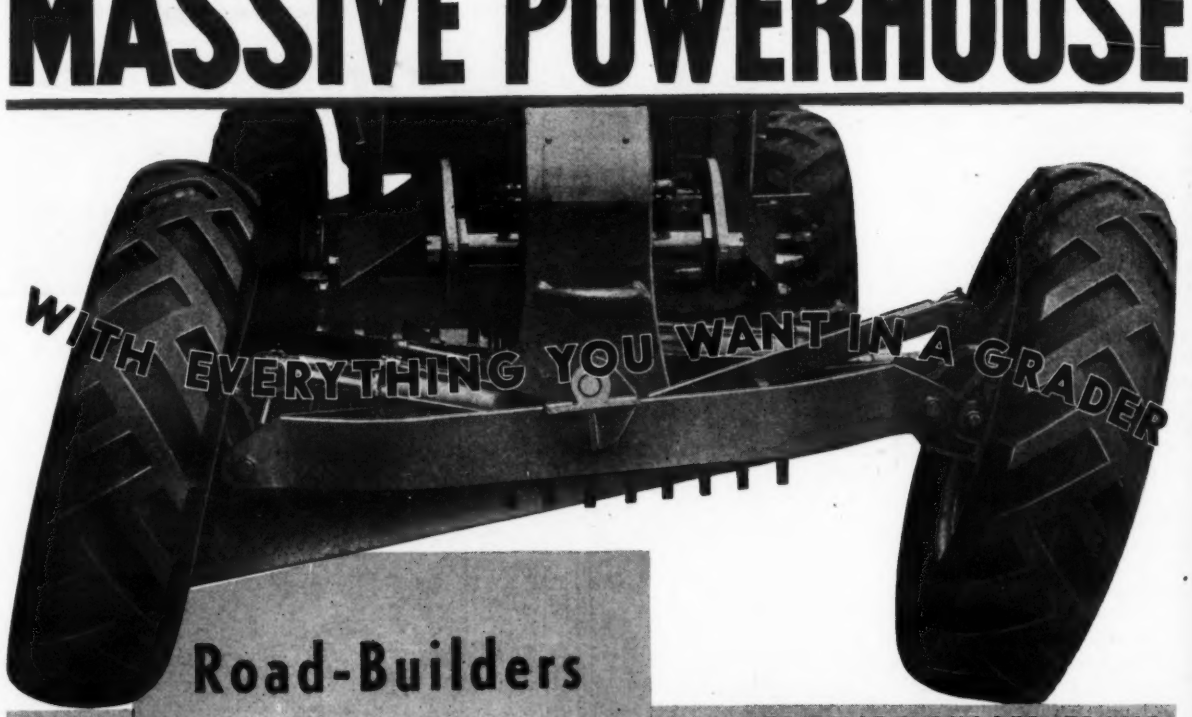

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Here, above, a load of asphalt is going to be sent out to a road job in Colorado. And at right, bituminous shoulders are being installed to improve a concrete highway.

Maintenance of these roads consists of replacing major failures by rebuilding the bases to higher standards and then re-covering them with higher-type bituminous paving. Less-serious damage is frequently upper-decked with hot-mix. Potholes and minor failures, of course, are patched with pre-mixed material the same way this work is generally done throughout the west.

The special bituminous crews, each a crack team of paving specialists, have their own field offices, materials, and equipment. Equipment generally consists of 9 motor graders, a 1,000-gallon pressure distributor, 2 booster tanks, 2 asphalt trailer tanks, a pneumatic roller, 2 tandem 10 to 14-ton steel rollers, 2 spreader boxes, a rotary power broom, a 3-car steam heater and retort, an air compressor, a supply trailer, 2 tractor loaders, and a dump truck or two.

During the summer months from May to October, these crews do one betterment job after another. Between jobs, or after the regular construction season, they pre-mix and stockpile the bituminous patching material. During the winter months, the best key men of each crew take their machines in to a division headquarters equipment shop and overhaul each item, to put the machines in top shape for the next construction season.

The portable asphalt plants turn out about 30 tons per hour, and the crews often mix and lay about 1,500 tons of material in a week.

For corrugated or badly "shoved" asphalt roads, due to subgrade failure, the old asphalt mat is ripped up and bladed aside. Objectionable subgrade material, mud, or mush, is also removed. Select granular material or crushed sub-base rock is then trucked in, laid, and rolled in place. Not until the cause of failure is thus removed is the asphalt surface re-laid.

The State has recently purchased a new unit, which on the basis of initial demonstration tests promises to solve most of the bituminous reconstruction problem. The machine is the recently introduced Wood Preparizer. Built with heavy-duty scarifying and pulverizing parts, this machine will pulverize and salvage much old asphalt formerly laid back down in chunks, or wasted. With asphalt commanding higher prices than ever before, this is no small item.

When bituminous surfaces have to be thickened, and the base is good, an upper-deck course is laid. The surface of the highway is broomed and a prime coat of MC-0 asphalt is applied. Then the hot-mix material is trucked in and spread in the same manner that second courses are laid on concrete pavements. Nostrip or other water-resistant additives are generally used in all surface and patch mixes because of the moisture conditions usually present.

Bituminous seal-coating and armor-coating work introduces one of the good practical tricks employed by Colorado maintenance men. With 3,200 miles in the bituminous system, about 800 miles a year have to be sealed if the rounds are to be made every four years. Sealing is done with RC-4 or RC-3 asphalt, applied at an average rate of 0.25 gallon per square yard and then covered with

(*Continued on next page*)

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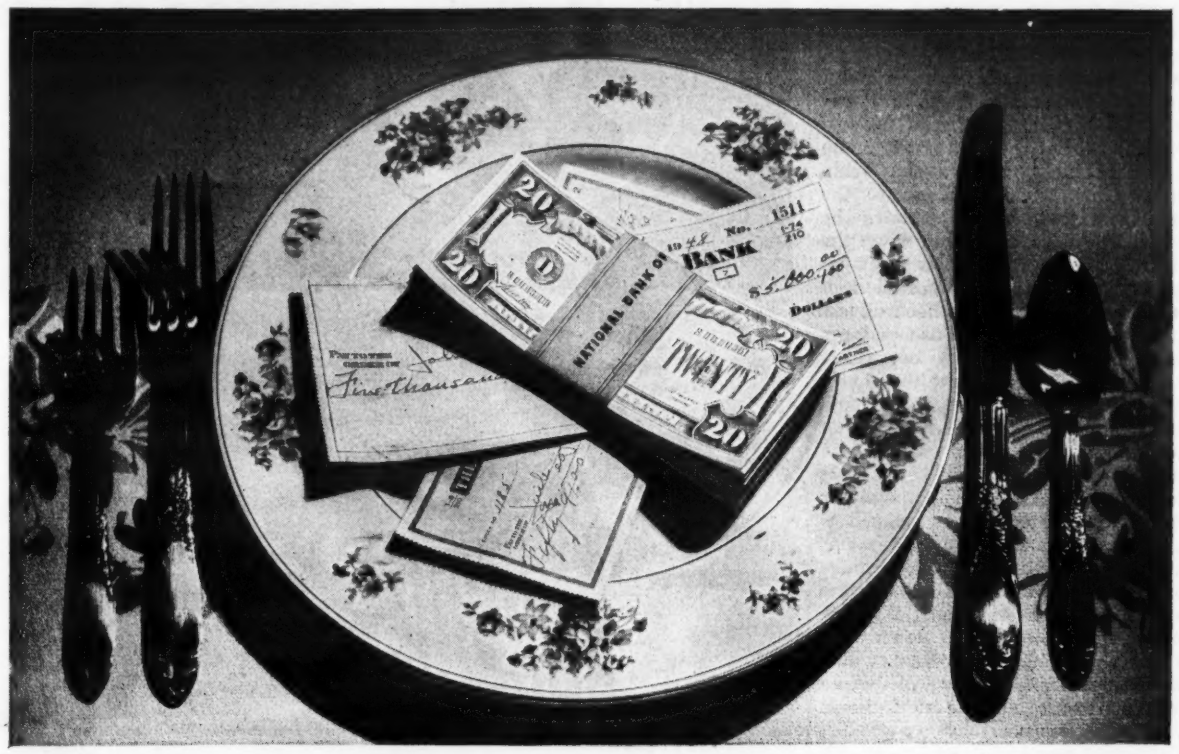

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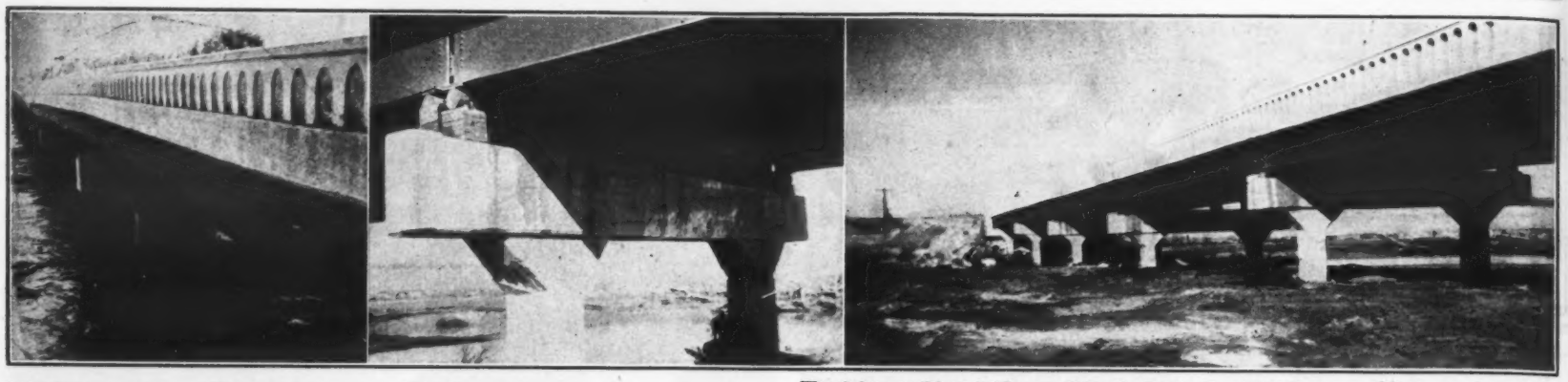


The Arkansas River bridge on Colorado Route 71 settled in some of its bents a maximum of 22 inches (first photo). Maintenance men jacked up the I-beam girders and placed steel shims on top of the concrete pile caps (second photo) to bring the bridge back to elevation, as good as new (third photo).

Maintenance Patrols Speed Road Repairs

(*Continued from preceding page*)

⅝-inch-minus stone chips.

Many states, in applying chips, use spreader boxes on the backs of dump trucks, and the trucks back over the fresh oil. Colorado uses a much faster trick. The spreader box is mounted on the front end of a motor grader, where it can be controlled by the scarifier rams. The box easily holds a full truckload of material.

With the box full of chips, the motor grader moves rapidly ahead until the load runs out. It then backs up just far enough to let the next truck dump its load in the box on a stone-chip footing. The truck pulls away, the grader goes forward and scatters the next load of chips, and so on down the highway. Much of the slow back-up work is eliminated, and the problem of unskilled truck drivers has been solved.

Colorado feels that the use of large ⅝-inch-minus chips gives her roads the type of skidproof surface they need, especially when snow begins to fall.

The maintenance men have another trick to prevent rain from soaking into their pre-mixed piles of bituminous patch material. As the hot-mix plants turn out this material, it is stacked to as near a peak as possible. A motor grader helps to shape the pile, to make its cross section approximately the shape of an equilateral triangle. A few men then pat the surface down with the flat sides of shovels. Rain which falls on such a pile will run off before it can penetrate, and the stockpile is always ready for use.

Three rock-crushing crews, each with a small portable plant, work the year round when weather permits. Ordinarily by the first of October the fast-moving bituminous crews have exhausted all the crushed-rock stockpiles. Then when they knock off, the crushers again get ahead. At first the crushers did not turn out the production they were rated for, but this was solved when the operators achieved a better balance in their screens and made the roll crushers also do their share of the work.

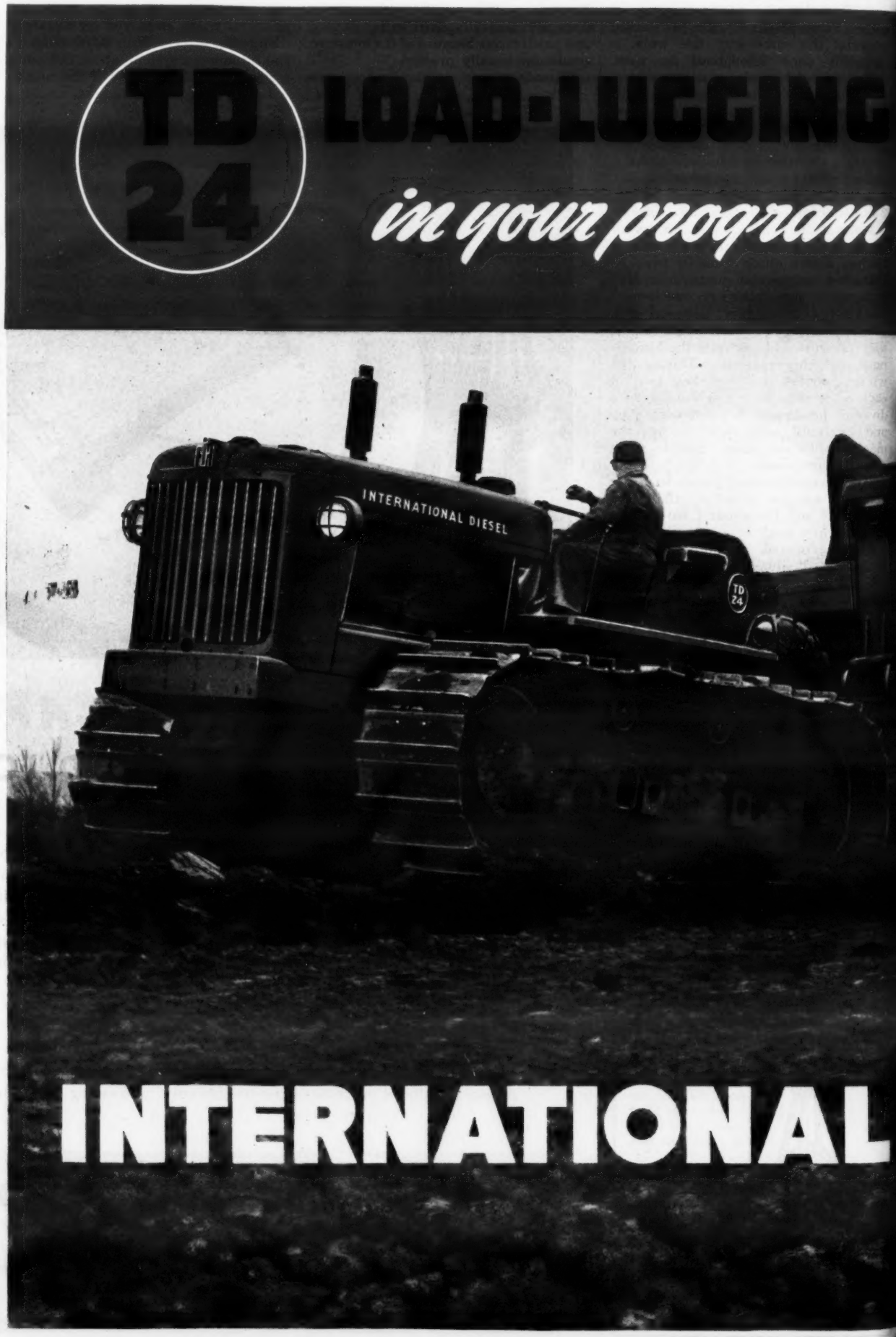
These portable crushers consist generally of all-portable units, with 9 x 36 jaw crushers, 24-inch rolls, and vibrating screens. They produce all aggregates for bituminous work, and occasionally turn out material for gravel roads.

Auxiliary Maintenance

Colorado is a state where the other items of maintenance—ditches, weed removal, roadside development, bridge repair, snow removal—are all first-line jobs of their own. Snow removal is especially so (see C. & E. M., Feb., 1948, pg. 71). With peak yearly snowfall up to 900 inches, it is 24-hour-a-day work to keep the highways clear. Each major mountain pass has its snow station, its crews, and equipment. Stewart operates on the principle that it is much easier to keep a road open than it is to open it after snow had blocked it. Last winter a 12-foot snow gage at Berthoud Pass was out of sight much of the time, in one of the worst winters Colorado has had in many years.

Roadside ditches are pulled to im-

(*Continued on next page*)



Snow removal is a major maintenance battle in Colorado, with a peak yearly snowfall up to 900 inches. The Snogo at left battles a drift high up in Loveland Pass. Each major mountain pass has its snow station, crews, and equipment. Above, maintenance forces use a Koehring Mud-Jack to raise and level a settling concrete slab.

prove drainage, to clean away any filled earth or debris, and to control weeds. The material thus removed ordinarily has to be loaded and hauled away. Athey loaders and front-end tractor loaders are invaluable for this work.

Weed control is a big, expensive problem. While the State uses 53 mowers, mowers alone are not the final answer because of the repair costs when they have to work in rough right-of-way. In an effort to solve this problem, the State began experiments about a year ago with 2, 4-D sprays, which show great promise of ridding the roadsides of weeds, willows, and small brush.

Last year the State purchased ten new Weed-O-Matic 750-gallon spray tanks for the application of 2, 4-D liquid hormone-type spray. Equipped with 20-foot spray bars and a hand spray, these machines can be pulled by a truck, and will effectively kill weeds at speeds of 3 to 5 miles per hour. Where heavy brush is encountered, the men stop the machine and soak the offending brush with the hand spray. Recommendations of the 2, 4-D manufacturers call for a gallon of the liquid concentrate per 400 gallons of water. The capacity of the Weed-O-Matic tanks makes it easy to dump 2 gallons in the concentrate cylinder, where it feeds the liquid to the water intake manifold. The spray bar can be raised or lowered, and will clear obstructions.

Since this method of weed control permits grass to remain alive, it is preferred to burning, which also has been tried with not too much success. The use of hormone sprays now promises to be a lower-cost answer to the old problem of weed removal, which formerly used up big hunks of maintenance funds.

Maintenance forces also do quite a bit of planting for erosion control. Deep-rooted yellow clover, brome grass, western wheat, crested wheat, and Canadian wild rye make the best seeding combination. The trend towards elaborate roadside planting of trees, shrubs, and extensive landscaping is now giving way to the more practical, lower-cost control of erosion through grass seeding.

Bridge upkeep is always good for more work than the Department can possibly do with any degree of comfort. Painting, repair of structural members, and re-flooring are some of the routine jobs. Last year it did a job which was not routine. The Arkansas River bridge on Route 71, between Rocky Ford and Ordway, settled in some of the bents a maximum of 22 inches. The problem was how to raise the bridge deck to its old elevation, and level the bridge deck to its old grade.

Some 50 and 75-ton hydraulic jacks were brought in and set under the deck when the riverbed was dry. The I-beam girders were then raised. Steel plates, made of 2-inch stock, were slipped in place on top of the concrete pile caps. The shims were built up under each of the six longitudinal I-beams to bring the bridge back to elevation, after which the jacks were removed.

(Concluded on next page)

The new "boss" of earthmoving is the International TD-24 Diesel Crawler. This mighty prime mover delivers *140 horsepower at the drawbar*—puts that horsepower to work boiling up heaping loads into big scrapers in a hurry! It lugs those loads to the fill fast!

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Maintenance Patrols Speed Road Repairs

(*Continued from preceding page*)

Use of Radio

The maintenance section of the Department soon hopes to have available for its use a radio frequency channel, which will permit the key maintenance men to keep in radio contact with each other for emergency and routine business. Present plans are to install radio equipment in the automobiles of the Superintendent of Maintenance, his seven assistants, and the major rotary snow-removal units. Later this pioneer use can be expanded.

Serious studies have also been inaugurated on the state highway system as a whole, so that maintenance and construction costs can be justified more intelligently.

Stewart, one of the state's real old-timers as a highway man, recognizes his problem these days as do all road maintenance engineers. The high cost of labor, of materials, and services is a never ending, day-to-day battle with a budget that never seems able to match the unpredictable load damage to the roads.

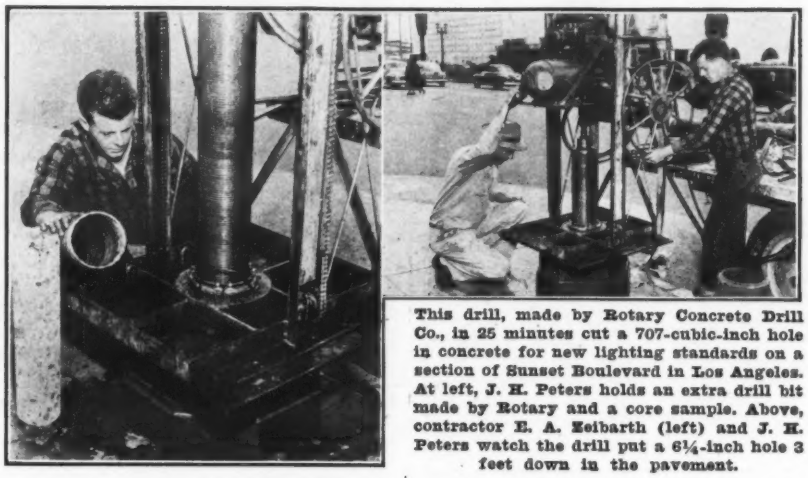
But Colorado is fortunate in its patrol system, because while Stewart worries with his budget, the men are constantly on the move repairing Colorado's roads.

And, for what it is worth, the writer may add this; a half dozen out-of-state tourists, interviewed at random, marveled at the efficiency of mountain-highway construction and its maintenance as exemplified in Colorado's highways. Six citizens were not quite as complimentary.

That's the way highway maintenance goes in any state!

Clean Holes Drilled Through Old Concrete

The City of Los Angeles recently decided that it needed 26-foot-high lights to bring lighting up to adequate standards on the stretch of Sunset Boulevard between Wilcox and Gordon, instead of the 18-foot-high ones already there. But to accomplish this, it was necessary to drill holes 6¼ inches in diameter and 3 feet deep in concrete to anchor the new standards. The holes frequently had to pass through the remnants of former light posts, cable, steel pipe, and electrical conduits.



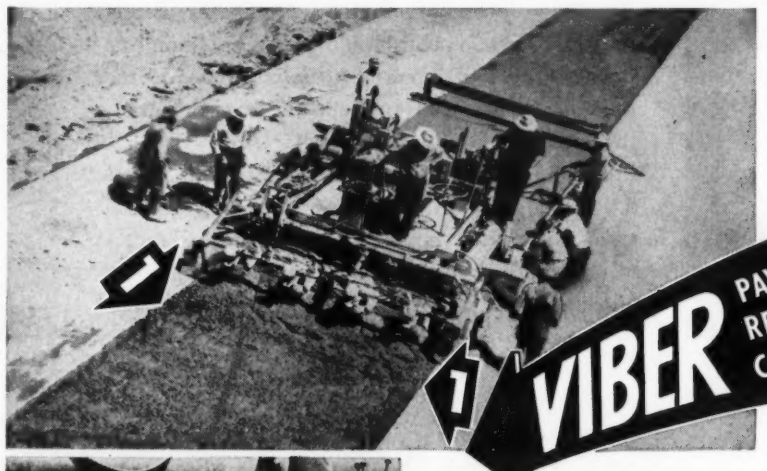
This drill, made by Rotary Concrete Drill Co., in 25 minutes cut a 707-cubic-inch hole in concrete for new lighting standards on a section of Sunset Boulevard in Los Angeles. At left, J. H. Peters holds an extra drill bit made by Rotary and a core sample. Above, contractor E. A. Zeibarth (left) and J. H. Peters watch the drill put a 6¼-inch hole 3 feet down in the pavement.

The drills selected by Zeibarth Contracting Co. for this job are made by the Rotary Concrete Drill Co., 650 Arroyo Parkway, Pasadena 2, Calif. They can be operated in electric or air drills running at speeds of from 200 to 800 rpm. The bits are available for digging holes ranging in diameters from ¼ to 2 inches, with sizes up to 6 inches made on special order.

The drills are made from cold-rolled steel. The cutters are heat-treated and then set in and brazed to the end of the bit shaft at a negative angle. Three cutters are used on the ¼ to 11/16-inch sizes; four or more on the ¾-inch and larger bits. The shafts are machined into a worm for about 3 inches up from the cutter. According to the manufacturer, the negative angle of the cutters produces a powdering or pulverizing action. The powdered material is then picked up and brought to the top by the worm.

The blunt-end design of the bits is said to enable the drills to go through gravel or round rocks in concrete. The larger size bits from ⅝ inch and up are made with a hollow center and have a slot in one side. These permit the bit to cut a small core which breaks up and passes out through the slot in the side.

Further information may be secured from the company, or by using the enclosed Request Card. Circle No. 70.



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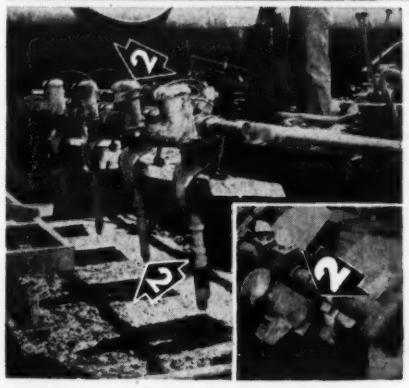

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CONTRACTORS AND ENGINEERS MONTHLY

New Concrete Road Built Over Old One

Grade Raised With 9-Inch Minimum Gravel Foundation Course on 11-Mile Project With Two-Lane Pavement

✦ STATE Route 31, north of Syracuse in central New York State, was reconstructed last year for 11.2 miles between Cicero and Baldwinsville in Onondaga County. The original 25-year-old plain-concrete pavement, running nearly east and west, was only 14 feet wide and 5 inches thick, with 4-foot shoulders. The new pavement of reinforced concrete is 22 feet wide of 8-inch uniform thickness, and has 10-foot shoulders. Where the road passes through the town of Clay, the pavement width is increased to 33 feet, while in Baldwinsville the concrete varies from 34 to 40 feet in width.

The New York State Department of Public Works awarded the job to D. W. Winkelman Co., Inc., of Syracuse, N. Y., on its low bid of $981,873.55. Work officially got under way the latter part of April, 1947, but the heavy spring rains were such an obstacle that no real grading was done until June. Paving began on July 30. Some 10.2 miles were completed in December, leaving 1 mile in the village of Baldwinsville to be finished this year.

Follows Old Alignment

When this stretch of the original highway was first laid out, the alignment was well chosen and designed, usually with long tangents and flat curves predominating. Consequently for about 10 miles of the job the new road follows closely the alignment of the old. The one mile of new location was put in to correct serious alignment defects due to the fact that the existing road attempted to avoid a swampy area. This could be drained successfully by modern methods to provide a satisfactory subgrade and good alignment.

But by this time the old concrete, only 5 inches thick, had been badly battered over the years. It had been given several bituminous surfaces in an endeavor to hold it together for just a few years more.

In following the old alignment the grade of the original road was raised by putting down a foundation course of run-of-bank gravel to a minimum thickness of 9 inches. At some locations of poor subgrade where the soil was silty and soft, this gravel course was increased in thickness to 12 and sometimes 15 inches. The material was spread to a width of 24 feet, or a foot beyond the pavement on each side. With this procedure the old pavement was left pretty much undisturbed. In the few locations where it did have to be removed, the old crumbly concrete was easily ripped out by a LeTourneau Rooter pulled by a Caterpillar D8 tractor.

Base Course

For the grading necessary to widen the roadbed, a fleet of five Tournapulls, averaging 12 yards a load, was used on hauls up to 2,500 feet. For shorter hauls, under 1,000 feet, two LeTourneau scrapers pulled by D-8's saw service. As soon as grading was finished on a section of road, the foundation course of gravel was laid. Four different pits, scattered along the job, supplied the material. A Northwest 2½-yard shovel dug out the gravel and loaded it to twelve trucks with a capacity of 5 yards each. This hauling, together with the delivery of the aggregate for the concrete, and later the batch hauling, was all sublet to Kenneth E. Fidler of Syracuse.

C. & E. M. Photo

This Buckeye power Finegrader is removing surplus material from between forms set for the Winkelman paving job on N. Y. Route 31.

On the gravel the average haul was 4 miles. The minimum 9-inch course was put down in two lifts—a 6-inch and then a 3-inch layer—and laid a foot wider than the pavement on each side. As the material was dumped on the roadbed it was spread by a Bucyrus-Erie dozer blade mounted on an

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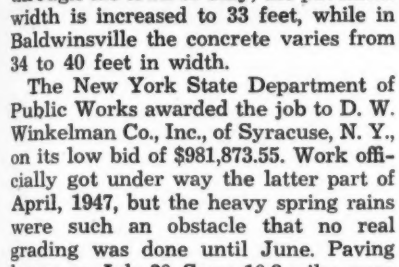

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ALHAMBRA, CALIFORNIA

New Concrete Road Built Over Old One

(*Continued from preceding page*)

International TD-14 tractor, and by a Caterpillar No. 12 motor grader. If the gravel was dry, which was seldom the case during the wet spell of early summer, a sprinkler truck watered the material. Each lift was thoroughly rolled by a 10-wheel rubber-tire roller pulled by a Minneapolis-Moline rubber-tired tractor.

Of no little help to the contractor was a soil map of the area which was prepared by the State Public Works Department. This map indicated clearly where the available sources of borrow and foundation gravel were located.

Along with the grading, seven new concrete box culverts were constructed to augment the existing structures on the old road.

Batch Plant

While the roadbed was being whipped into shape for the new pavement, a batch plant was set up at a siding of the New York Central Railroad alongside the highway near Moyers Corners, which is about 4 miles from Baldwinsville located at the west end of the job. This location resulted in a maximum haul of 7 miles for the batch trucks.

Crushed stone for the concrete was trucked to the plant from the Jamesville quarry of the Solvay Process Co., while sand was supplied in the same manner from the Massaro Sand & Gravel Co. of Fulton, N. Y. The aggregate was stockpiled at the plant, one pile for the sand and two for the different grades of stone. The material was loaded to a Blaw-Knox 150-ton 3-compartment aggregate bin by a Lorain crane with a 60-foot boom and a Williams 1-yard clamshell bucket. A TD-18 tractor-dozer pushed the aggregate up into high piles to help the crane pick up a load.

Diagonally across the batch-plant yard was a Blaw-Knox 300-barrel cement bin. This was supplied with bulk cement from the Lehigh Portland Cement Co. at Buffalo, N. Y., and the Alpha Portland Cement Co. at Catskill, N. Y. The bulk freight cars emptied into a trough between the track in which a worm gear moved the material to the enclosed bucket elevator. From there the cement was lifted to the bin.

C & E M. Photos

At the batch plant for the Winkelman concrete-paving job in New York (above), a clamshell charges the Blaw-Knox aggregate bin. In the right background is the Blaw-Knox cement-storage bin, and in the right foreground a truck gets natural cement from the platform where the bags are stacked. The other photo shows a Milwaukee Model H-2 Hydro-Crane unloading forms from the flat-bed truck on which it is mounted.

More to the front of the plant was a cement shed and platform for storing bags of Rosendale natural cement which was supplied by Wait Associates, Inc., of Binnewater, N. Y. By mixing one bag of natural with 8 bags of portland cement for every batch, a more workable and durable concrete was obtained. The natural cement came in freight cars to the siding and was unloaded by hand onto the platform.

The batch trucks, holding two batches each, first backed under the aggregate bin to pick up the sand and stone. They

(*Continued on next page*)

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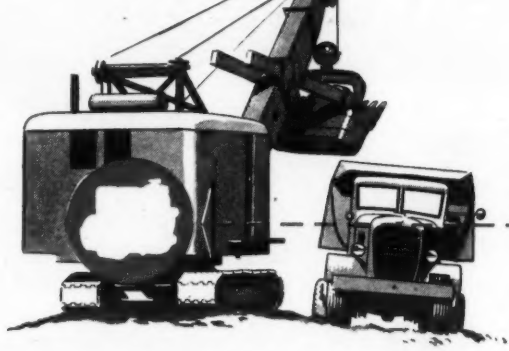

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C. & E. M. Photos

These views of paving operations on N. Y. Route 31 north of Syracuse, between Cicero and Baldwinsville, show (left) a batch of concrete dumped in front of a Blaw-Knox spreader, on top of the wire-mesh reinforcement; and (right) the Blaw-Knox two-screed finishing machine, the Blaw-Knox spreader, and the MultiFoote 34-E Duomix paver.

then ran down to the back of the plant and passed under the portland-cement bin. On the way out, the natural cement was added as the trucks stopped at the platform.

The Mix

The weights of a 9-bag batch of concrete were as follows:

Cement	846 lbs.
Sand	1,750 lbs.
Stone, No. 1 and No. 2	1,300 lbs.
Stone, No. 3A	1,550 lbs.
Water	35 gals.

A 9-bag batch yielded 1.33 cubic yards of concrete. The stone was a mixture of 52 per cent of size 3A and 48 per cent of No. 1 and No. 2. Of the latter combination 40 per cent was of No. 1, and 60 per cent of No. 2. The stone was graded from 1⅞-inch down to ¼-inch. A sieve analysis of the aggregate follows:

Sieve Size	Per Cent Passing			
	No. 3A	No. 2	No. 1	Sand
1⅞-inch	100	....	....	....
1-inch	48	100	....	....
½-inch	....	....	100	....
¼-inch	....	....	....	100
No. 4	....	....	....	99
No. 14	....	....	....	66
No. 48	....	....	....	23
No. 100	....	....	....	2½

Forms and Fine-Grading

The gravel base course was given a final shaping by the motor grader, using both blade and scarifier when necessary. The objective was to get down to within 1½ inches of final grade, and remove the rest after the forms had been set. A string was then stretched

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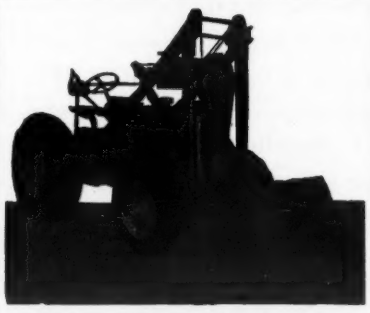

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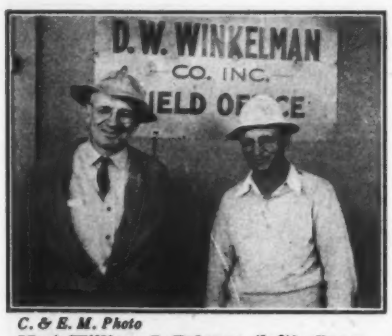


C. & E. M. Photo
Meet William J. Delaney (left), Superintendent for Winkelman on the Baldwinsville paving job, and Resident Engineer Howard H. Phillips.

New Concrete Road Built Over Old One

(Continued from preceding page)

out for a high line which the Cleveland Formgrader followed in digging the form trench. Another line was strung next, 13 inches in from the first, as a guide for the form setters.

On the job were 8,000 linear feet of forms—Metaform, Heltzel, and Blaw-Knox—and at least 1,000 feet on both sides were always ready ahead of the paver. The forms were easily and quickly handled by a truck-mounted Milwaukee 2-ton Model H-2 Hydro-Crane with a 25-foot boom. Located right behind the cab, the crane loaded the forms onto the flatbed of the truck, and moved them along to the section of road being prepared for paving.

When the forms were true to line and grade, being set 11 feet apart for each line, a Buckeye power Finegrader rolled over them, removing surplus material and throwing it off to one side. When the first lane was being poured, the anchor cables on the machine were secured to the form pins ahead on each side. On the second lane, pins were driven along the new concrete slab to which the cable on that side was fastened. The grade was then rolled by a Buffalo-Springfield 5-ton tandem roller which was also equipped with a scarifier in case some high spots had to be erased. A scratch board was pulled along for a check on the depth, and the forms were oiled.

William J. Delaney, Superintendent for contractor Winkelman, put particular emphasis on cutting the grade to the exact depth required, getting in neither too much nor too little concrete. He had a force of 18 men ahead of the paver on this work, and kept close check on it himself. During his 30 years of superintending jobs, he has never had to remove a slab for being less than the required depth.

Paving Operations

The north lane was paved first, with the MultiFoote 34-E Duomix paver working outside the forms. On the second, or south, lane the paver worked within the forms since it was not permitted to operate from the concrete. In the latter case it pulled a scratch template along immediately behind to check the grade before the concrete was discharged from the bucket sliding along the 35-foot paver boom. A short distance ahead of the paver, when it was working between the forms, were two baffle timbers about 20 feet long. These were placed from 30 to 50 feet apart, butting up against the concrete lane already poured. They permitted the batch trucks to back down off the pavement onto the grade, and after discharging their loads into the skip, to regain the pavement. Two timbers were used, one to get off and the other to get back on the pavement, which speeded up the movement of trucks. Cables, with a hook at the other end, were fastened to these timbers, so that the trucks could readily move them ahead as the paver advanced.

Water for the mix was pumped from creeks along the project by a C. H. & E. No. 11 3-inch triplex pump, directly into two 2,000-gallon tank trucks. While one truck was getting filled at the creek, the other was at the paver. The pump on the paver drew the water out of the tank through 50 feet of 2-inch hose line. Each truck held enough water for paving two blocks or slabs which are 94 feet 6 inches long.

Between these blocks are Acme spade-type expansion joints with 9 spades or dowels to a side. The joint supports a strip of bituminous material 11 feet long x 7½ inches deep and ¾ inch thick. This was kept ¾ inch down below the top of the concrete so that the open joint could be poured later on with asphalt filler. A metal channel cap with 2-inch lips fitted over the top of the expansion material.

The butt-end longitudinal joint between the lanes is tied together with ¾-inch bolts on 5-foot centers inserted at the mid-depth of slab. When the first lane was poured, these bolts were embedded in the concrete together with a burr, 3 inches long, at the outer end. Later, when the other lane was paved, the other half of the bolt was screwed into this burr for 2 inches of its length, giving it firm support. When in place, the total length of the bolt is 20 inches, or 10 inches into each lane.

Concrete Finishing

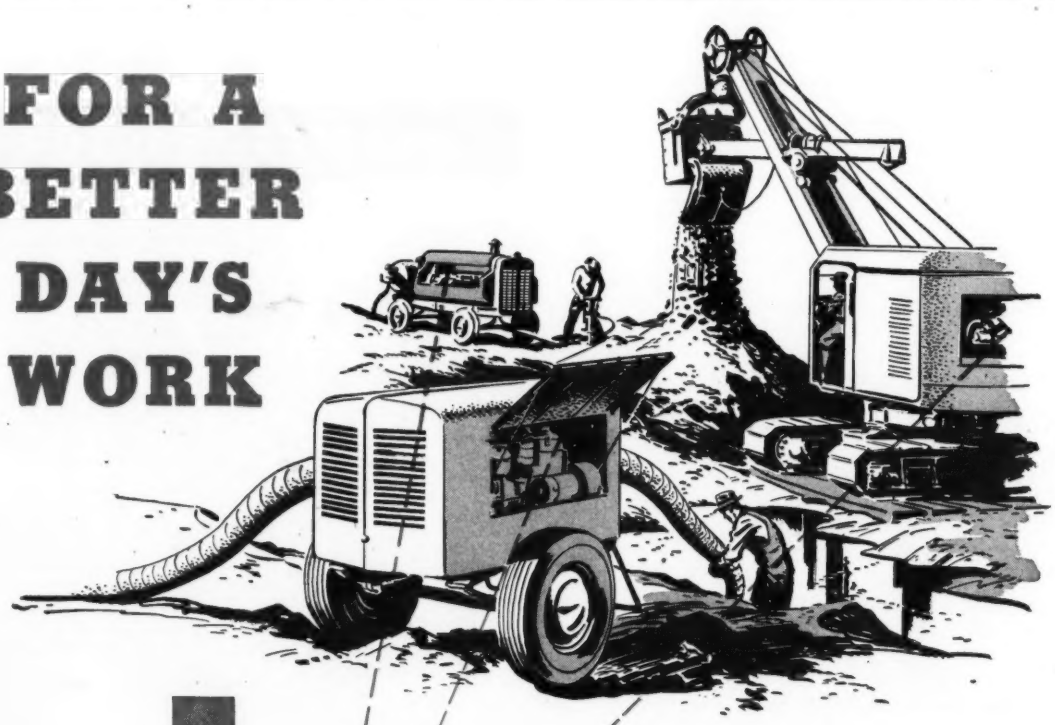
From 4 to 20 trucks carried batches, according to the length of haul. After the contents were discharged into the paver skip, one of the workers struck the truck body with a sledge to dislodge all the material. This same man also kept the subgrade wet down with a ¾-inch hose. Batches were mixed one minute in each of the two drums on the MultiFoote 34-E Duomix paver, before being discharged in front of the Blaw-Knox paddle-type spreader. At the rear of the spreader was a vibrator stretching the full width of the pavement.

The spreader struck the concrete off on a plane 2 inches below the top of the forms, and then backed up so that the mat reinforcement could be laid in place. The mesh was supplied by the American Steel & Wire Co. of Syracuse, and was usually handled by the Hydro-Crane truck which distributed it along the road. Two men picked up the mats and placed them on the first lift of concrete. More concrete was then deposited on top of the steel. The spreader made another pass, this time leveling off the concrete even with the top of the forms.

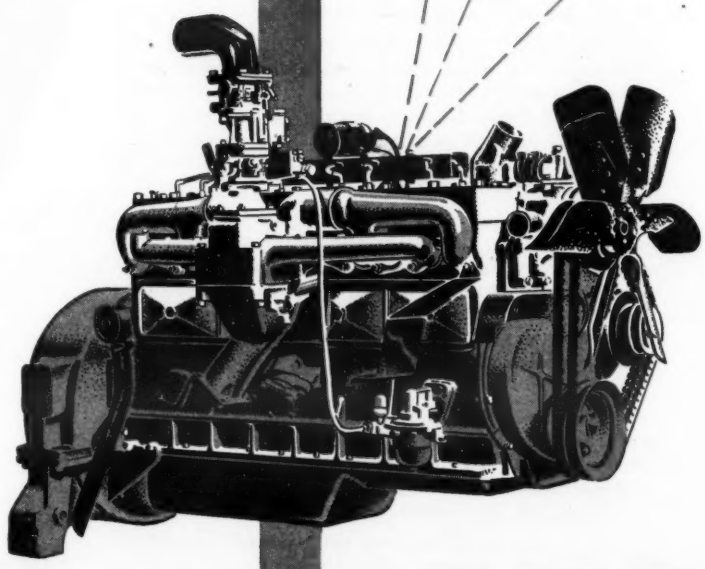
Behind the spreader came a Blaw-Knox two-screed finishing machine, followed by a Koehring Longitudinal Finisher. When these mechanical finishers had completed their work there was little for the three hand finishers to do. Two of them, working from their side of the slab, completed any additional floating with a darby or hand float—a 1 x 6, 5 feet long, at the end of a 12-foot handle. The surface was also constantly checked with a 10-foot aluminum straightedge, and then roughened slightly by pulling a fiber broom transversely across the slabs.

(Concluded on next page)

FOR A BETTER DAY'S WORK



ON THE HIGHWAYS—ON FARMS—IN OIL FIELDS—IN FORESTS—AND IN INDUSTRY!



● On tomorrow's highways, roads, streets and airports—wherever construction stretches past the horizon to a better world—Chrysler Industrial Engines and Power Units are on the job. They offer rugged power for shoveling or leveling . . . smooth, economical power for pumping or pressure . . . dependable power for tight day and night schedules. And, behind each Chrysler Industrial Engine stands the engineering and production skill of Chrysler Corporation—your assurance of a better product that's built For A Better Day's Work.

CHRYSLER
INDUSTRIAL ENGINES

HORSEPOWER WITH A PEDIGREE

INDUSTRIAL ENGINE DIVISION CHRYSLER CORP., 12200 E. JEFFERSON, DETROIT 31, MICHIGAN

Working from a bridge, the finishers cut and edged the joints with a ¼-inch-radius tool, and pulled the caps from the expansion joints. The openings at the top of these joints were filled with sand which was later blown out with compressed air. Then the joints were all poured at once with asphalt filler. Curing of the concrete was done with the Hunt Process, a membrane compound which was put on the surface from a mechanical sprayer.

The morning following a pour, the form pins were quickly removed with a lever-arm pin puller which rolled along on a rubber-tired carriage. They were then moved ahead for re-setting. The usual working day was 10 hours, beginning at 8:00 a. m. and finishing at 6:30 p. m., with a half hour for lunch. The average daily production of pavement was 2,000 linear feet of single lane which involved the placing of 530 cubic yards of concrete. The equipment was serviced by a Federal truck on which was mounted an Alemite lubrication unit and a Kellogg air compressor.

Quantities and Personnel

The major items on the 11.2-mile concrete-paving contract included the following:

Unclassified excavation	212,000 cu. yds.
Foundation course, bank gravel	44,225 cu. yds.
Cement-concrete pavement	34,100 cu. yds.
Cast-iron pipe, 12 to 20-inch	1,802 lin. ft.
Concrete pipe, 24 to 30-inch	459 lin. ft.

An average force of 125 men was employed by the contractor under the direction of Superintendent William J. Delaney. For the New York State Department of Public Works, Howard H. Phillips was Resident Engineer. The project is located in the Third District which is headed by William Robinson, District Engineer with headquarters in Syracuse. Charles H. Sells is Superintendent of the Department of Public Works with headquarters at Albany, and B. D. Tallamy is Chief Engineer.

Portable Heat Unit For Cold-Weather Use

A portable steam or hot-water heating unit is announced by Arthur C. Baumann, 7011 Grays Ave., Philadelphia 42, Pa. The Eco-Temp automatic oil-fired heater is for such uses as thawing out materials and equipment, keeping concrete mortars warm until initial set takes place, drying paints and plaster, heating shelters and workmen's booths, etc.

According to the manufacturer, all that is required for operation of the unit is a source of 110-volt 60-cycle single-phase ac electricity, an opening for a smoke pipe, and a water hose. The heater burns No. 2 fuel oil.

The Eco-Temp is made in two styles. The steam unit is 26½ inches wide, 61 inches long, and 78 inches high. It is designed to deliver up to 181,000 Btu's per hour. The hot-water unit is 26½ inches wide, 48 inches long, and 78 inches high. It will deliver up to 113,000 Btu's per hour.

Further information may be secured from the company, or by using the enclosed Request Card. Circle No. 54.

Victor Opens Ill. Plant

The Victor Equipment Co., San Francisco manufacturer of flame-cutting apparatus and distributor of welding supplies, has opened its new Chicago branch office and assembly plant. Carl Peterson is Branch Manager and Dorsey Tweedie is Office Manager of the plant, which is located at 1312 W. Lake St.

The Chicago office will handle, in addition to the Victor Weld electrodes and arc welders, the products of the Miller Electric Mfg. Co., Stoody Co., Jackson Products, Handy & Harman, The Sight Feed Generator Co., Independent Pneumatic Tool Co., Plomb Tool Co., Lyon Metal Products, Inc., American Optical Co., Hewitt Rubber Division of the Hewitt-Robins Co., General Electric Co. cable, and others.

Data on Rubber Belting

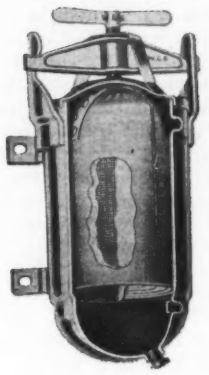
A line of high-capacity narrow-width rubber belting is described in a bulletin issued by the Gates Rubber Co., 999 S. Broadway, Denver 17, Colo. The bulletin describes this new belt, the research leading to its development, its basic characteristics, its principal features, and recommended uses.

Among the features of this new development are high capacity with a small cross section or increased capacity in a normal cross section. The bulletin contains a drawing of a typical application of the Gates belt in restricted lateral space, and points out how it is especially adaptable to this type of service.

Copies of this literature may be obtained from the company. Or use the enclosed Request Card. Circle No. 72

Get All the Lubrication Good Oil Provides!

WGB Clarofication Assures Lower Lubrication Costs—Longer Engine Life



AND HERE'S WHY: Intensive laboratory tests prove that correctly processed, properly formed and adequately supported, fine cotton is the most efficient filtering medium for all kinds of oil. Further, WGB Clarofication thoroughly cleans the oil—without removing essential additives or other lubricating qualities. The WGB Cartridge outlasts other types by a ratio of 2 to 3 . . . cuts engine repairs to a new unheard-of low—and can be changed without tools! Get to know the advantages of WGB Clarofication.

W. G. B. Oil Clarifier, Inc.

139 Cornell St.
Kingston, N. Y.

Lightweight*

*means greater "digability"

HENDRIX Lightweight DRAGLINE BUCKETS

3 TYPES DESIGNED FOR EVERY DIGGING CONDITION

LS . . . A lighter weight bucket designed for levee and drainage work.

TS . . . A medium weight bucket, classified as a general purpose bucket.

HS . . . A heavy duty bucket for moving shale or any hard formation.

You automatically step up the "digability" of your dragline when you hook up a Hendrix *Lightweight* Dragline Bucket! Hendrix Buckets are *engineered* to provide this greater *"digability"* through the elimination of all excess weight. This has been done without sacrificing any of the strength, durability and toughness so necessary in a dragline bucket.

⅜ to 40 Cubic Yards

12% Manganese Steel Chains and Fittings are standard on all types and sizes.

With or Without Perforations

Write for descriptive literature or ask your dealer.

HENDRIX MANUFACTURING COMPANY
MANSFIELD INCORPORATED LOUISIANA

Big Plant Produces Aggregate for Dam

(*Continued from page 2*)

in the production of stone. He wanted a plant designed to operate continuously, even though major units had to be cut out for extensive repairs. He wanted all special structures, hoppers, chutes, and supports to be engineered to accurate dimensions to save field work and valuable erection time.

So well did these two men design the big plant that after it had produced 25 per cent of the stone and sand for the job, only one change had been made. Two 40-inch hammermill crushers had been planned, but they operated too efficiently and too much minus-100-mesh fines were being produced by the milling action of the machines. One hammermill was then taken out, and in its place went a 3-foot short-head Nordberg-Symons cone crusher. This gave a better sand gradation, with not as much waste.

With time a problem, Hawkins and Peterson had to expedite a monstrous order of equipment—about $685,000 worth. Major headache was the purchase of 37 electric motors, because a power line was being installed to the job by the Grand River Dam Authority. Scrubbers were so scarce that they had to convert a 5 x 24-foot Cedarapids asphalt-plant drier to fill one bad gap on 1½-inch rock in the last line.

According to the men on the job, full production was reached on the deadline only through the excellent cooperation of the James W. Bell Co., Cedar Rapids, Iowa, Cedarapids distributor in that state. Added to this cooperation were careful planning, engineering, and just plain ingenuity on the part of the men who fought the problem in the field.

Stripping Starts

The quarry area lay under overburden from 0 to 26 feet thick. Borings showed good limestone beyond that depth, in flat strata, on which an excellent quarry floor could be developed with good shooting.

Two Ingersoll-Rand 500-cfm compressors with four Ingersoll-Rand wagon drills went to work. The overburden consisted of dirt, clay, rotten limestone, and some very hard rock. Jackhamers were also used on shallow work. About 150,000 cubic yards of material was drilled, shot, loaded out by two P&H shovels and a Koehring shovel, and carted away to waste areas by Euclids and by the fleet of Koehring Dumptors which now feeds the plant.

Quarrying Methods

With the overburden out of the way, heavy quarry work commenced. The quarrying operation was planned to produce well broken rock, in shots of from 7,000 to 15,000 tons at a time, with an absolute minimum of secondary shooting. All rock has to be able to pass through 25 x 40 Cedarapids primary jaw crushers.

For that reason, wagon drilling continued to be used, rather than heavier massive drilling. Steel 30 feet long was brought in, and the ledges were planned 27 feet thick. A staggered grid system of holes is being used, usually 5½ x 7 feet, though some 6 x 8-foot shooting also has been done.

The limestone is not hard on drill bits. The detachable Ingersoll-Rand Jackbits that are used drill from 50 to 100 feet without re-sharpening or losing gage. A wagon drill which gets 500 feet per 8-hour shift uses only five or six bits in drilling the limestone. The quarry is a driller's dream, due largely to the careful stripping to produce an even floor. It is not difficult to move the wagon drills from hole to hole.

Ordinarily five rows of holes are loaded and shot. It is interesting to note that no loading can be done during local thunderstorms, because lightning may strike high ground near-by and set off some of the charges. This happened early in the job, at night, when nobody was around. Because of the danger of lightning, only about 10 to 15 tons of powder and a few caps are kept on hand in the two magazines about 1,000 feet back of the quarry.

C. & E. M. Photo

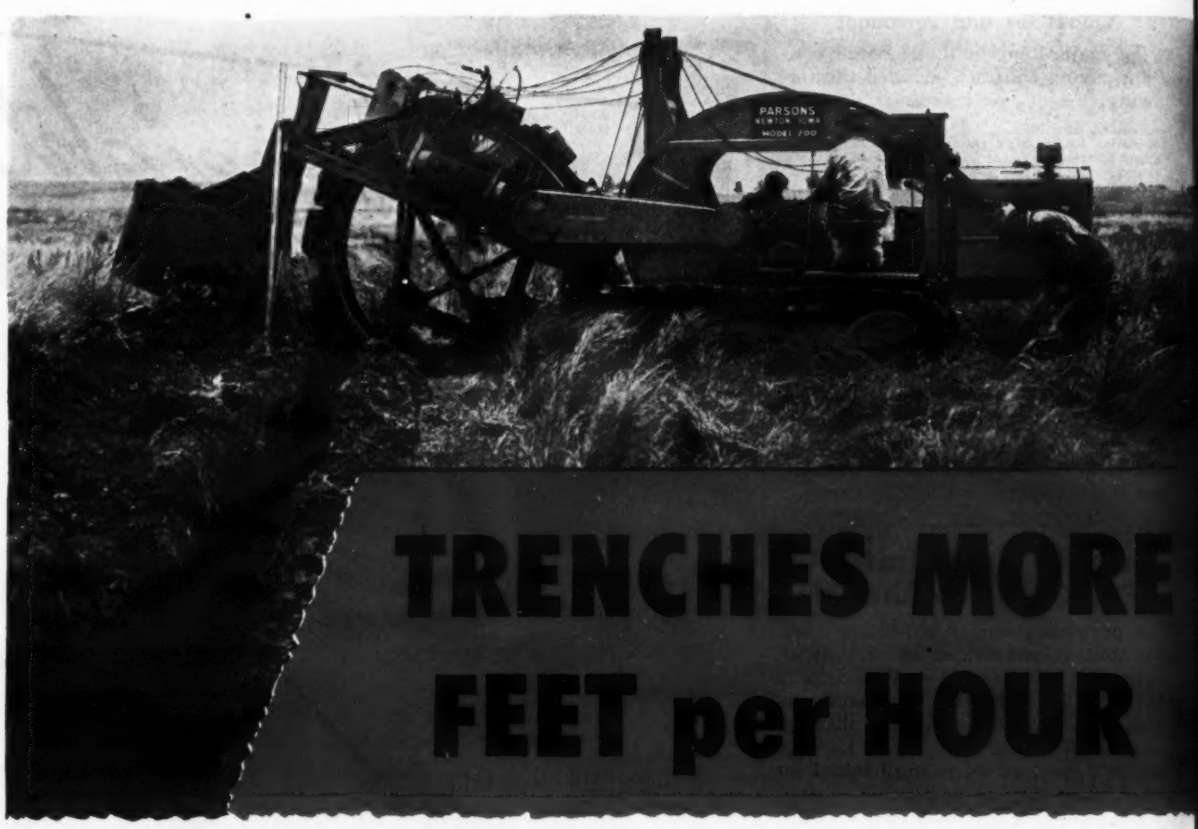
A sand transport truck dumps to a steel feeder hopper at the site of Fort Gibson Dam. A Goodrich conveyor carries the sand to a trestle-mounted stacker which puts it away in the storage pile.

The holes are loaded with Hercules No. 1 or No. 2 Gelamite, at a blasting ratio of 2.25 pounds of powder per ton of crushed aggregate produced. An interesting system of blasting cap delays is also being employed to fracture, loosen, and pile the broken rock. On the holes next to the face of the shot, instantaneous caps are used. On the second row, alternate holes have regular and No. 1 delay caps. The third row has all No. 1 delays. The fourth row uses No. 1 and No. 2, placed alternately. The fifth row uses all No. 2 delays. If a sixth row is shot, No. 2 and No. 3 delays are placed alternately.

When this kind of shot is fired with the blasting machine, the effect of breaking is almost miraculous. As each row goes off, the rock leaps out and falls loose and broken on the pile. After the last row of holes fires, a neatly broken pile of loose stone lies ready and waiting for the shovels.

Two P&H power shovels, a 655B and an 855B, load the stone. A Koehring Model 604 is also used. These machines keep a fleet of 8 Koehring Dumptors shuttling back and forth the 600 feet between the quarry and the primary

(*Continued on next page*)



200 wheel Trenchliner digs up to 20′ per minute

Here's a high-production trencher that can dig as fast as 20′ per minute on your farm, airport and highway drain-tile jobs. In oil fields, a mile of pipeline trench a day is not uncommon with this Parsons 200 wheel Trenchliner. Digs 15" to 26" wide, up to 5′-6" deep . . . produces clean, smooth-walled trenches that require no costly hand trimming.

Pivot-mounted wheel maintains accurate grades

Specified drainage and irrigation ditch grades are easier to maintain, because wheel responds instantly to hoist . . . it's pivot-mounted, not tied down to dirt-catching, elevating slide tracks. Dirt, mud or grit can't affect its responsiveness. Wheel hoist alone controls digging depth. Three-point hoist cables, worm gearing in wheel hoist case, and sensitive disc clutches give you accurate grade control adjustment to fraction of an inch.

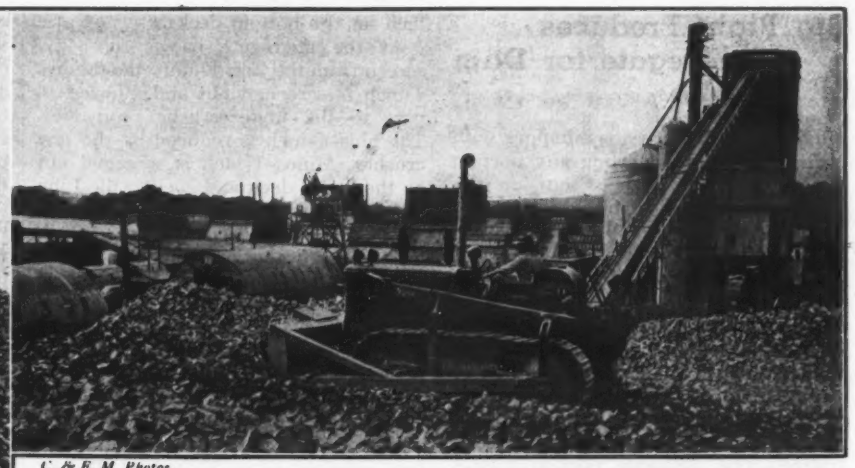
Delivers dependable, trouble-free service day after day

Heavy-duty wheel is supported at 4 points . . . is held firmly at bottom where digging pressure is greatest. Rugged arched wheel-frame rigidly supports both digging wheel and conveyor . . . keeps wheel precision-aligned for accurate grading. Main operating gears are fully enclosed . . . run in continuous oil baths . . . minimize maintenance, give you longer, trouble-free service.

Your Parsons distributor can show you many more production-boosting features about this 200 wheel Trenchliner. It's the fastest-digging of all 4 Trenchliner models built by Parsons. Get complete facts and figures from your distributor TODAY.

KOEHRING PRODUCT

PARSONS *Trenchliners*



C. & E. M. Photos

The photo at left, taken at the Weaver aggregate plant, shows a conveyor dumping to a huge stockpile of cobbles. At the dam stockpile, the International TD-18-mounted Bucyrus-Erie dozer shown above keeps 6-inch cobbles leveled.

crushers.

A blacksmith shop at the quarry operates only about 3 days per month because of the small amount of drill-steel breakage. In this shop are an Ingersoll-Rand drill sharpener and an Ingersoll-Rand furnace. Very light-weight aluminum loading rods are used to tamp the sticks of powder in holes.

Aggregate Plant Routing

The routing of broken limestone through the aggregate plant is a complicated but orderly process. It is so set up that by-passes, alternate routes, two 3,500-ton stockpiles halfway through the cycle, and many storage bins can all be used to vary the ratio of materials almost any way that may be desired.

Specifications call for the following sizes of material to be produced:

Cobbles	3 to 6-inch
Aggregate	1½ to 3-inch
Aggregate	¾ to 1½-inch
Aggregate	No. 4 to ¾-inch
Sand	No. 0 to No. 4

The complicated flow plan includes four separate aggregate lines. All equipment on these lines is Cedarapids unless otherwise noted.

Production Line No. 1: Broken material is dumped by Koehring Dumptors to a 25 x 40 crushing unit. This unit consists of a 3½ x 10-foot heavy-duty apron feeder complete with charging hopper, the crusher, and a 36-inch under-crusher conveyor. The crusher is driven by a Caterpillar D13000 diesel engine.

Stone fed to the jaw crusher is reduced to 8-inch-minus. Rock passing through the crusher is then carried on a 30-inch x 38-foot feed conveyor, discharging to the feed end of a scalping screen on a portable scalping unit. This unit is made up of a 4 x 10-foot double-deck horizontal screen, a 10 x 36 jaw crusher, a 30-inch x 21-foot under-crusher conveyor, and a 24-inch x 57-foot return conveyor. The secondary crushing unit is driven by a Caterpillar D8800 engine, and the conveyor is driven by an electric motor. The top deck of the scalper has 3 to 6-inch openings; the larger openings, of course, are on the discharge end. The bottom deck has 1½-inch openings throughout.

Underneath the screen is a large receiving hopper with an adjustable swing gate whereby the aggregate rejected by the bottom deck of the screen may either be by-passed to the conveyor, or returned to the under-crusher conveyor. The swing gate is set to utilize the entire bottom deck of the screen, so that all of the minus-1½-inch aggregate will discharge onto the discharge conveyor. The 6-inch-minus to 1½-inch which is retained on the bottom deck passes onto a side discharge chute, thence to a 30-inch x 118-foot conveyor. The plus-6-inch passes through the 10 x 36 jaw crusher, and is reduced to pass the 6-inch screen.

This aggregate passes over two conveyors to re-enter the feed conveyor, and thus closes the crushing cycle on this unit. The 6 to 1½-inch aggregate conveyed on the 118-foot conveyor discharges to a 3,300-ton stockpile, to be tapped later by production line Number 3.

Minus-1½-inch rock produced by both the primary units in Line 1 then passes to a 4 x 12 double-deck screen, mounted on an 8 x 18-foot 2-compartment bin. This screen, driven by a 15-hp electric motor, has 1-inch mesh on the top deck and ¼-inch on the bottom.

(Continued on next page)

16-S DANDIE* folds batch 80 times per minute

Re-mixing drum folds batch 80 times during average 1-minute mixing cycle . . . thoroughly cement-coats every particle. Discharges full batch in 2½ revolutions. Side or end discharge. Can also be equipped with special, 90"-wide open end skip for loading from batch trucks . . . speeds production on many jobs. Other DANDIE sizes: 3½-S, 6-S and 11-S.

*Trademark Reg. U. S. Pat. Off.

KWIK-MIX COMPANY
PORT WASHINGTON, WIS.

ROADBUILDERS' batchers adaptable to fit any bin

Johnson Roadbuilders' Batchers are completely portable . . . adaptable to fit any bin . . . provide accurate control. Single-material batcher (foreground) can be arranged for gang operation, to batch 2 materials in practically same time as 1. Multiple-aggregate batcher (background) handles 2 or 3 materials. Other Johnson sizes, types to fit every plant problem.

C. S. JOHNSON COMPANY
CHAMPAIGN, ILLINOIS

Lays Tile 20% Faster

Parsons tile chute, optional on the 200 Trenchliner, can increase output as much as 20%. It slides tiles to bottom of chute . . . eliminates much heavy tile lifting . . . reduces muscular effort. Efficiently installs tile even in caving ground. This labor-saver, *plus* Trenchliner's accurately-graded trench, means more drainage installed per shift.

PARSONS COMPANY
NEWTON, IOWA
Koehring Subsidiary

MUD-JACK* offers big profit opportunities

Koehring Mud-Jack offers many opportunities for very profitable contracting service. Its low-cost method of stabilizing sub-soil and raising concrete structures opens a wide field of applications around factories, on bridge and highway work, foundations, on railroad track stabilization. 3 sizes — big Model 50 illustrated. Write for catalog.

*Trademark Reg. U. S. Pat. Off.

KOEHRING COMPANY
MILWAUKEE 10, WIS.

Big Plant Produces Aggregate for Dam

(*Continued from preceding page*)

Underneath the screen is a hopper with a swing gate for diverting any portion of the material screened out on the bottom deck, plus all of the aggregate screened out by the top deck.

An additional swing gate at the end of this screen permits all of the aggregate passing over this screen to be diverted to the compartment of the bin near the intake end of the screen. Thus, the amount of material to be wasted due to the presence of argillaceous material, shale, or dirt in this portion of the aggregate can be accurately controlled. The desirable portion passes into the compartment of the bin on the discharge end of the screen, and onto a conveyor. This conveyor takes the minus-1½-inch aggregate out to the 0-1½-inch stockpile.

Production Line No. 2: This line produces principally the 1½-inch aggregate. The Dumpfors dump to a 25 x 40-inch primary crushing unit similar to the one in Line 1, except that this unit has a 36-inch x 27-foot under-crusher conveyor. The heavy-duty apron feeder and the under conveyor are both controlled by manually operated clutches.

The primary crusher, set at 6 inches, will handle about 150 tons an hour. Passing rock goes to a 36-inch x 27-foot conveyor, which carries the material to a portable scalping unit driven by International UD-14 power. This unit consists of a 10 x 36 jaw crusher, a 3½ x 5-foot heavy-duty horizontal scalping screen, a 30-inch x 20-foot under-crusher conveyor, and a 30-inch x 25-foot conveyor. Openings in the screen are 4 inches on the top deck; 1 inch on the bottom deck.

As the aggregate passes over the screen from the 25 x 40 unit, the minus-4-inch is screened out and allowed to pass to the under-crusher conveyor. The plus-4-inch is reduced by the jaw crusher. Minus-1-inch is screened out on the lower deck and goes to the Line 1 conveyor and thence to the stockpile. This provision allows all minus-1-inch produced by the primary unit to be removed, and eliminates the greatest portion of undesirable material at this point.

Minus-4-inch material produced by the 10 x 36 jaw, together with that bypassed by the 3½ x 5-foot screen, is transferred to the 30-inch feed conveyor which feeds a roll-crusher unit. This unit consists of a 42-inch x 12-foot double-deck horizontal screen, a 40 x 24-inch roll crusher, and a 24-inch return conveyor.

This aggregate is then discharged to the feed end of a double-deck screen, which has a 2½-inch top deck and a 1½-inch bottom deck. The minus-1½-inch aggregate is screened out immediately, and the balance of the oversize is reduced to 1½-inch size by the 40 x 24-inch roll crusher, set at 1 inch.

The crushed aggregate is transferred to a conveyor, thence to the feed conveyor, thus closing the cycle. The minus-1½-inch produced by this unit passes onto the receiving hopper underneath the 3½ x 12-foot screen, and discharges to an 85-foot conveyor. From there it passes to the 3,300-ton stockpile in which 0-1½-inch material is stored. This stockpile, incidentally, allows for variations in feed and also presents a supply of crushed stone for final sizing, washing, and manufactured-sand production in the event of a breakdown on this line.

Production Line No. 3: This part of the flow is for sizing, washing, and final crushing of the 6 to 3-inch aggregate and the 3 to 1½-inch rock. Underneath the 3,300-ton stockpile of 6 to 1½-inch rock is a 30-inch reciprocating-type plate feeder, which is enclosed below the ground level in a 10-foot tubular tunnel. The feeder regulates the accurate flow of the material to a conveyor which feeds the sizing unit in this setup.

The sizing unit consists of a 3½ x 12-foot double-deck screen mounted on an 8 x 18-foot 3-compartment bin. The top deck has 3¼-inch mesh; the bottom deck has 1¾-inch. On the discharge end of the screen, chutes with swing gates are provided for diverting aggregate rejected by both the top and bottom decks; in this way, any portion of either the 6 to 3 or the 3 to 1½-inch sizes can be diverted into a 7 x 12-foot Telsmith scrubber, or into a 12 x 36-inch jaw crusher for further reduction for the 1½-inch aggregate.

The purpose of this control is to balance the output of these two sizes of aggregate. The 1½-inch that may have passed over the screens is screened out on the bottom deck and is transferred to the 24-inch conveyor carrying the returns from the 12 x 36 jaw crusher to the main conveyor in Line 4. That portion of 6 to 1½ aggregate diverted there discharges into the Telsmith rotary scrubber. Powered by a 100-hp electric motor, this scrubber is kept filled to proper level with water, and all argillaceous material, shale, and objectionable matter is removed from the rock.

Aggregate then discharges directly to a 4 x 12-foot double-deck screen equipped with spray bars for washing the aggregate. The top deck has 3¼-inch openings; the bottom deck has 1¾-inch. The finished sizes of 6 to 3-inch and 3 to 1½-inch pass off the top and bottom decks, respectively, and discharge to the receiving hoppers on two 24-inch x 92-foot conveyors.

It was found that the vigorous action of the scrubber caused about 20 per

(*Continued on next page*)

Contractors GET SET FOR WINTER JOBS!

RUN DOWN BATTERIES? FLAT TIRES? SHORT DAYS?
ELIMINATE ALL THESE WORRIES WITH A

GRIFFIN HIGH-LIGHT GENERATOR
and Compressor Service Unit.

- STARTS DIESEL AND GASOLINE POWERED EQUIPMENT
- INFLATES TIRES
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- CHARGES BATTERIES

Equipped with 12-volt D.C. 400 amperes, 110-volt A.C. Single phase 45 or 90 amp. Air Compressor 8-40 cu. ft. per min. Air cooled or Water cooled engines.

OUTLETS FOR OPERATION OF SMALL TOOLS.

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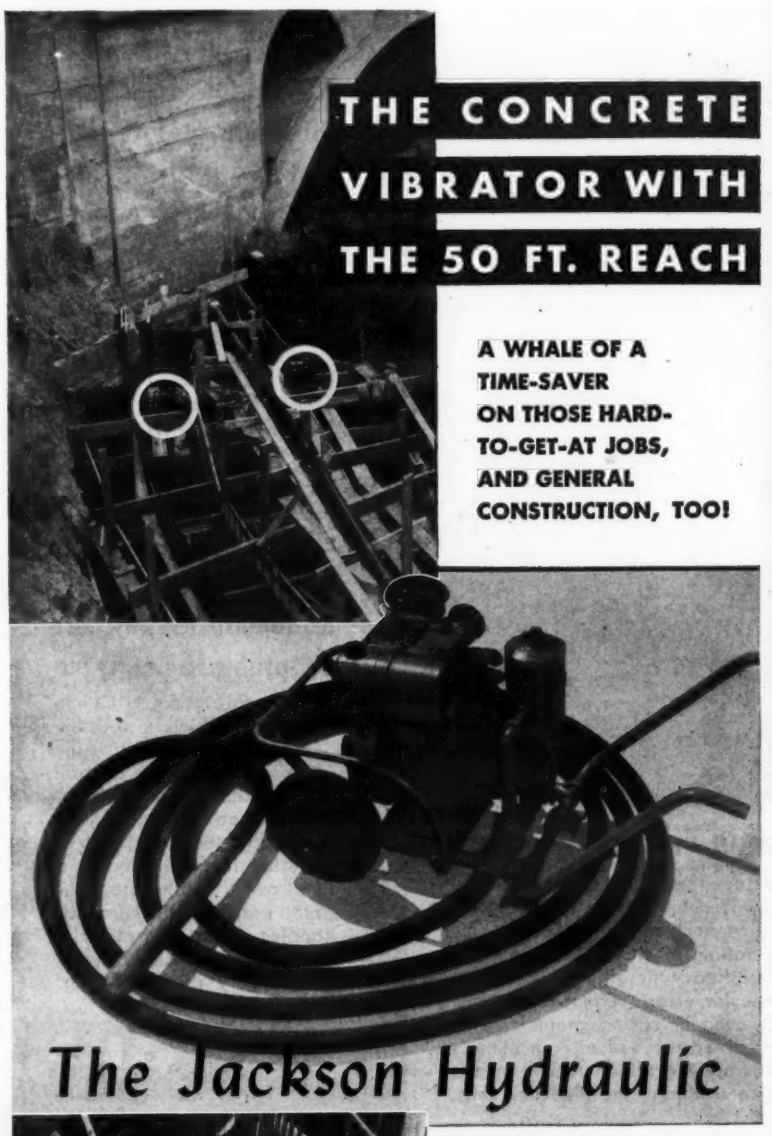
GRIFFIN EQUIPMENT CORP. 331 East 141st St. New York 54, N.Y.



The 50' hose length with which this vibrator is available makes frequent changes of location unnecessary, keeps the machine working, greatly reduces non-productive time. Interchangeable fittings permit reversing the hose whenever wear makes it desirable.

The Jackson Hydraulic has no troublesome parts to break, and since all parts run in oil, no lubrication problem. It's powered by a husky Wisconsin engine and frequency is instantly adjustable from 4,000 to 7,000 VPM. Let us send you the complete facts on this finest of all vibrators for general construction purposes.

ELECTRIC TAMPER & EQUIPMENT COMPANY • Ludington, Mich.

C. & E. M. Photo
George L. Gibson, left, is Weaver's Field Superintendent at Fort Gibson Dam, and L. H. Peterson, right, is Weaver's General Superintendent.

cent of the aggregate to be broken below 1½ inch. This made it necessary to install a 16-foot bucket elevator. Minus-1½-inch stone drops with waste water and is flumed to the foot end of this elevator which returns it to the final sizing screen, thereby eliminating any waste of this aggregate.

There was no permanent water supply near the quarry site, so a reservoir was built about 1,700 feet from the crushing plant. To insure maintenance of the water supply, two 4-inch four-stage high-pressure Gorman-Rupp water pumps were installed about 2½ miles away. These were connected to a 6-inch pipe line, which will be operated at different intervals in order to keep a safe level in the reservoir. A 6-inch high-pressure split-case Carver pump connected to a 150-hp Fairbanks-Morse motor delivers about 2,500 gpm to the washing unit through an 8-inch supply line.

Vegetation was not cleared in the upper end of the pool so that flumed waste would drop the solids in the upper end, leaving the lower pump-intake end of the pool clean and clear.

Production Line No. 4: Line 4 is the final washing and sizing section for the 1½ to ¾-inch and the ¾-inch to No. 4 aggregates, and the final diversion of the aggregate to be fed to the manufactured-sand line. Underneath the 3,300-ton stockpile of 1½-inch-minus material is a 2½ x 3-foot apron feeder, powered by a 3-hp Master Electric Co. variable-speed gear-head electric motor. This feeder is enclosed in a 10-foot-diameter pipe tunnel, together with the 128-foot feed conveyor. This conveyor transfers the aggregate to two sizing-bin units.

Each of these units is composed of two 8 x 18-foot bins, with two compartments, and two 4 x 12-foot double-deck horizontal screens powered by 15-hp G-E motors. A 2-way chute provided with a swing gate is located at the head end of the long feed conveyor, distributing the aggregate evenly on the feed end of each 4 x 12-foot screen. This makes it possible to control the flow of the aggregate on either screen so that the sand line or the washing section may be varied or cut off at a moment's notice. The bottom deck of each screen has No. 4 mesh; the top deck is ¾-inch, allowing the load to be split on the two screens.

On the discharge end of the screen is a 3-way chute with 3 swing gates which permits the aggregate to be diverted to the sand, or to the washing sections and directly into the 5 x 24-foot scrubber. It is also possible to return rejected aggregate from the top deck of the screen to the 12 x 36 jaw crusher for further reduction.

The scrubber is powered by a 75-hp G-E motor. From the scrubber, the material discharges directly onto a 4 x 12-foot double-deck horizontal screen equipped with spray bars, where the final washing of the stone is accomplished. The top deck of this screen uses ⅞-inch mesh; the lower deck uses No. 4. The minus-No. 4 material, consisting mostly of rock dust and clay, is flumed away in the waste-water line which returns the water to the reservoir.

The aggregate is separated into 1½ to ¾-inch and ¾-inch to No. 4 sizes, and conveyed to a 300-ton storage bin by two conveyors. The 1½ to ¾-inch and ¾-inch to No. 4 aggregates which discharge from the screen farther back pass directly into the bin compartment and onto the 30-inch feeder which regulates the flow to the entire manufactured-sand line.

Sand Manufacture

Manufactured sand comprises 27 per cent of the total production, and must meet the following rigid specifications as set up by the Corps of Engineers:

Screen Size	Per Cent Passing
No. 4	95-100
No. 8	80-90
No. 16	60-80
No. 30	30-60
No. 50	12-30
No. 100	3½-10

In addition to the grading limits above, the sand must have a fineness modulus of not less than 2.40 or more than 2.90, and must not vary more than 0.10. The grains must not be more than five times the length of the shortest dimension. Regular tests are conducted every hour on sand, and three or four times per shift on the four sizes of aggregate.

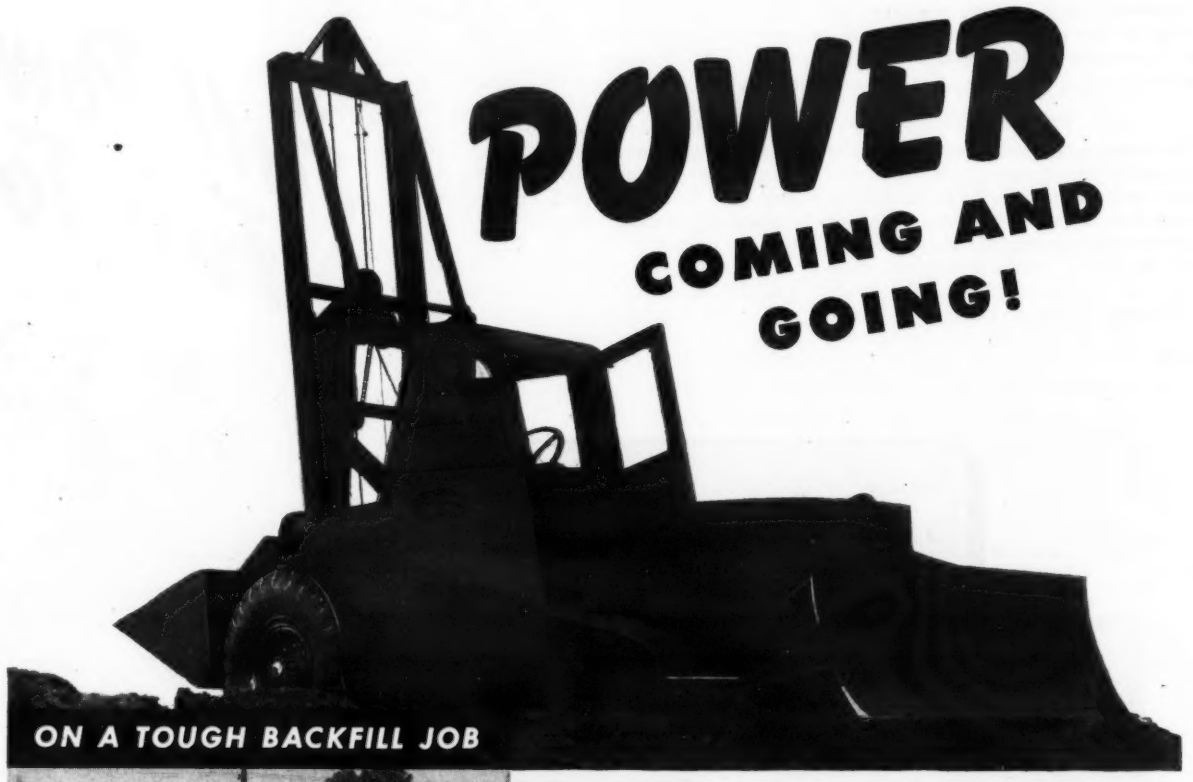
Minus-No. 4 aggregate, which passed through the screens of Line 4, discharges into the bin compartment near the feed end of each screen, and is carried to the 10-foot Sturtevant air separator mounted on two 30-ton steel bins. Minus-100-mesh material collected by the air separator is deposited in one of the bins and hauled to the waste stockpile by trucks.

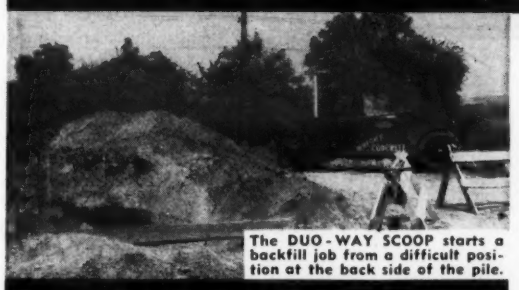
The minus-No. 4, plus-100-mesh is fed onto a 24-inch conveyor with an 18-inch apron feeder. This insures an even flow of material to the sand line. These fines are produced from the crushers on the aggregate lines and contain many sliver-shaped and elongated particles. At this point the fines are returned to the main sand line to be reduced to a cubical shape by a hammermill powered by a 150-hp motor. The main flow of the sand line is controlled by a 30-inch belt feeder, and discharges into a 2-way chute above another hammermill and the cone crusher.

These machines are both powered by 200-hp motors, and a 2-way chute has a swing gate for varying the flow of materials to either hammermill or cone crusher. The finished material is carried by conveyor to a 2-way chute, with a swing gate for varying the flow, at the feed end of two 4 x 12 double-deck special horizontal screens. They are mounted on a 150-ton bin. The bottom deck of this screen has No. 10 mesh; the top deck has ⅜-inch mesh.

Oversize from the top and bottom decks of both screens is returned to an additional 30-inch hammermill for further reduction, and then conveyed for recirculation over the sizing screens, thus completing the cycle. The final-sized material from both screens is car-

(Concluded on next page)




The DUO-WAY SCOOP starts a backfill job from a difficult position at the back side of the pile.

15 MINUTES LATER

A trench through the pile has been completed. 60 to 75 yards of dirt moved.

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DUO-WAY SCOOP

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Big Plant Produces Aggregate for Dam

(*Continued from preceding page*)

ried by 24-inch conveyors to the 16-foot Sturtevant air separator, driven by a 75-hp motor. The minus-100-mesh fines rejected by the air separator pass onto the 24-inch conveyor which discharges into the 30-ton bin. From there they also are trucked away to the waste pile.

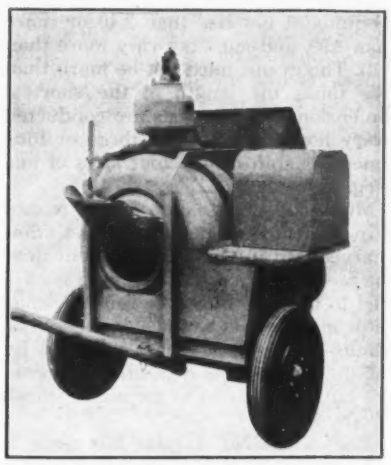
Part of the material by-passes the air separator by means of a 2-way chute with swing gates, and, together with the finished product from the air separator, passes to the 150-ton storage bin. Sand production at the plant averages 60 tons per hour.

Finished aggregates are hauled to the dam site by 10 semi-trailer-type trucks, owned by Millay & McBride of Waco, Texas, and under the supervision of L. (Fibber) McGee. They haul about 16 cubic yards per load. The 4½-mile haul road was built by the prime contractors.

CONTRACTORS AND ENGINEERS MONTHLY is indebted to a report prepared by George C. Hawkins for details on crushing lines, and acknowledges it with thanks.

Personnel

The plant is under the supervision of General Superintendent L. H. Peterson, with George L. Gibson as Field Superintendent and L. W. Kemp in charge of drilling and blasting operations. Sherman Herter is Plant Foreman, Jack Austin is Master Mechanic, Ben Bretz is in charge of second-shift maintenance work, and Floyd Knapp is Quarry Foreman.



Multiple V-belts replace the customary gear or chain sprocket surrounding the mixing drum of the new 3½-S Dandie concrete mixer.

Concrete Mixer Uses V-Belt-Drive System

Road Show visitors had a chance to inspect for the first time the new, improved 3½-S Dandie concrete mixer recently produced by Kwik-Mix Co. of Port Washington, Wis., a Koehring subsidiary. They noted particularly that the usual gear or chain sprocket surrounding the mixing drum had been replaced with multiple V-belts. Reasons for the change, the company explained, were reduced maintenance costs and smoother, more silent operation.

Another design change in the 3½-S machine has involved shifting the entry of water from the automatic water-measuring tank through the charging side of the mixer—to lessen the chances of clogging and produce a more uniform mixture. Moreover, a new type of lever on the hopper gate keeps operating parts outside the hopper and permits all levers to be grouped on one side of the machine. A manually controlled hopper shaker is also provided for use when necessary.

Further information may be secured from the company, or by using the enclosed Request Card. Circle No. 10.

Heavy-Duty Bucket Loaders

A 24-page catalog on its Models 80 and 135 heavy-duty bucket loaders has been prepared by the George Haiss Mfg. Co., Inc., Division of Pettibone Mulliken Corp., 381 Canal Place, The Bronx, New York 51, N. Y. The Models 80 and 135 loaders are for use in digging and loading crushed stone up to 4 inches, sand, gravel, coal, and similar material. They will also excavate and load in one operation bank-run sand and gravel, as well as topsoil. Both models can be furnished wheel or crawler-mounted.

Among the features of the Haiss loaders described in detail in the bulletin are the hydraulic-system elevator, the self-feeding device and clean-up scraper, the avalanche protection, master propellers and cobble-guard plate, topsoil cutters, steering and braking, the crawler details, the 3-point suspension, and the swivel chute. Specifications are listed for rated capacity, power unit, transmission, controls, etc. Also listed are general dimensions and shipping weights.

Copies of this literature may be obtained from the company. Or use the enclosed Request Card. Circle No. 89.

Nelson Corp. Ups Hodges

James D. Hodges has been named Eastern Divisional Manager by The Herman Nelson Corp. of Moline, Ill. He will handle the company's line of portable heaters and portable ventilators. He formerly held the position of Service Manager of the Portable Products Division.

Lippman Engineering Works quadruple agricultural limestone pulverizing unit powered by a Model ME-66 Murphy diesel engine through a Twin Disc Power Take-off.

The ability of Twin Disc Power Take-offs to transmit the full horsepower and full torque of internal combustion engines throughout the life of the equipment is an important reason why so many leading engine manufacturers offer these units as standard equipment.

The actual torque capacity of the clutches used in Twin Disc Power Take-offs is far in excess of their rated horsepower capacity. Long service life and the ability to stand up under temporary overloads and normal slippage are outstanding characteristics of these Twin Disc units.

Twin Disc Power Take-offs consist of a complete clutch power take-off assembly with shaft and bearings mounted in a compact, rigid cast-iron housing. Clutches are either single (6.5″ to 24″) or two plate (11.5″ to 24″) of the gear-tooth type, with capacities up to 650 hp.

When ordering construction, material-handling or aggregate-plant equipment, specify a Twin Disc Power Take-off as a *must* with the engine selected. For complete information on Twin Disc Power Take-offs and Reduction Gears, write for Bulletin 129-B. TWIN DISC CLUTCH COMPANY, Racine, Wis., (Hydraulic Division, Rockford, Ill.)

Twin Disc Power Take-off.

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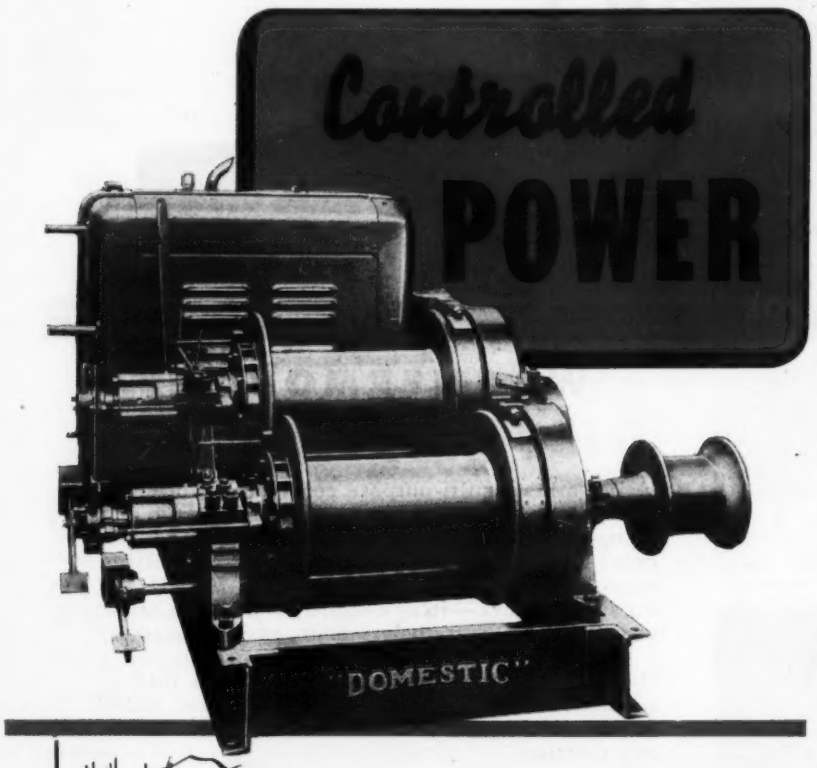

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The new Gar Wood Model 508 4-wheel scraper has a heaped capacity of 7.6 cubic yards. It is designed for use with tractors of 55 or greater hp, and is cable controlled.

Four-Wheel Scraper Is Cable-Controlled

A 4-wheel rubber-tired cable-operated scraper is announced by the Findlay Division of Gar Wood Industries, Inc., Findlay, Ohio. It is designed for use with tractors of 55 or greater horsepower. Its capacity is 7.6 cubic yards heaped, or 6 cubic yards struck.

The Model No. 508 takes cuts of 12 inches below the tires. The straight-line cable reeving is designed to save wear on the cable and to facilitate replacements. The pivoted-type bowl is designed to reduce friction of dirt. The scraper features fast, controlled dumping and spreading, the manufacturer explains.

Overall width of the Model No. 508 is 8 feet 10 inches. The wheelbase is 14 feet 6 inches; overall length including the drawbar is 23 feet 6 inches; bowl width inside is 7 feet 6 inches; depth of spread above tires is 18 inches; bowl clearance, raised for hauling, is 18 inches; apron opening is 36 inches; and the weight of the scraper is 10,200 pounds.

Further information may be secured from the company, or by using the enclosed Request Card. Circle No. 117.

Asphalt-Paving Machine

A single-unit machine for use in mixing and laying cold-mix and re-tread paving in one continuous operation is described in a catalog released by Hetherington & Berner, Inc., 731 Kentucky Ave., Indianapolis 7, Ind. The Moto-Paver is designed to lay paving in widths of from 8 feet 6 inches to 12 feet, and up to 7 inches in thickness.

The new catalog describes the features of the unit in detail, and includes several photographs of it in action. Other pictures show the Moto-Paver from several angles, and with its various attachments installed or removed. Special emphasis is given to the unit's main transmission, the mixer, the variable-speed drive on the asphalt pump, the right-hand distributing screw drive, and the mounting of the wheels.

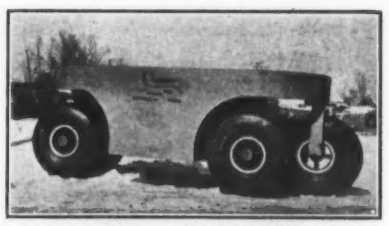
The booklet contains a full page of specifications and dimensions, and features a large diagram of the flow of material through the Moto-Paver. Specifications covered are those for the travel power unit, the mixing power unit, pugmill, aggregate feed and control, asphalt feed and control, asphalt-storage tanks, and strike-off and runners.

Copies of this literature may be obtained from the company. Or use the enclosed Request Card. Circle No. 17.

Rubber-Tire Roller

A pneumatic-tire roller is manufactured by Cemco, Inc., 2430 University Ave., St. Paul 4, Minn. It is designed to exert a pressure of from 50 to 400 pounds per linear inch. The box of the Flat-Iron roller has a capacity of 178 cubic feet. Weight of the roller can be varied by loading the box with from 5 to 14.8 tons of material, and by changing the pressure in the tires. If calcium chloride is used in the tires, the weight can be increased by another 2,500 pounds.

The Flat-Iron roller has an overall width of 84 inches and a compaction path of from 72 to 75 inches. It uses five 17:00 or 18:00 x 16-inch tires. According to the manufacturer, it will smooth as well as compact, and is for use on stabilized bases, bituminous cold-lay wearing surfaces, and seal-coat aggregates. Cemco also states that the natural creeping of material in front of the rolls provides sufficient kneading to obtain maximum density.



The new Cemco Flat-Iron roller is designed to exert a pressure of from 50 to 400 pounds per linear inch. It uses 17:00 or 18:00 x 16-inch tires on three axles.

Further information may be secured from the company, or by using the enclosed Request Card. Circle No. 106.

Whatever you buy, you want to know your purchase is honestly represented in materials, workmanship, and performance. You don't want a gamble. When the first truck mounted power shovel was built there wasn't much company, no guarantee, but that first shovel was the forerunner of all "QUICK-WAYS".

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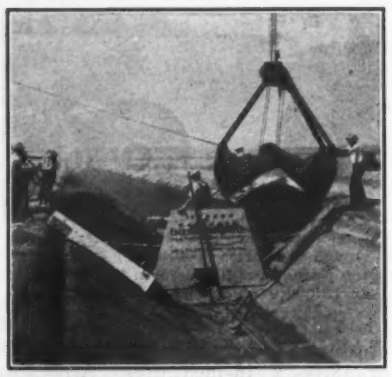


The Ekenstam Canal Paver made by Madsen Iron Works is designed to apply asphaltic-concrete or plastic soil-cement linings to canals. The machine can be used in laterals with slopes of 1½ to 1 and varying in width from 2 to 6 feet.

Canal Liner Places Asphaltic Concrete

A machine designed to line canals with asphaltic concrete or plastic soil-cement is manufactured by the Madsen Iron Works, 5631 Bickett St., Huntington Park, Calif. Known as the Ekenstam Canal Paver, it can be used in laterals with slopes of 1½ to 1 and bed widths of from 2 to 6 feet. Among the advantages claimed for this unit are that it lays a uniform and known thickness of lining; it does not require rails or other guiding means; density of the finished lining exceeds Bureau of Reclamation requirements; and speed on the job is held high due to the capacity of the paver. The manufacturer reports that on one job, linings with a density of from 90 to 97 per cent were laid at a speed of 1,847 linear feet in a period of 10 hours.

The paver is constructed on the principle of a slip form. It consists of a sled followed by a full-width hopper divided into pockets by diagonal fins, and center and side screeds to strike off the lining. The screeds have gas burners running their entire length for use when the machine is laying asphaltic concrete. Attached to the rear of the screeds are three steel floats to give the surface of the lining a final finish. Both the screeds and the floats are adjustable to vary the thickness of lining. The hopper is fitted with a distributor plate in the center so that the soil-cement mixture can be raked into place on the side slopes by men with mortar hoes.

When a soil-cement mixture is used, it is windrowed on the canal berm and picked up by the paver as it is pulled along by either winches, tractors, or other towing means.

Further information may be secured from the company, or by using the enclosed Request Card. Circle No. 55.

Catalog Lists 25 Pieces Of Construction Equipment

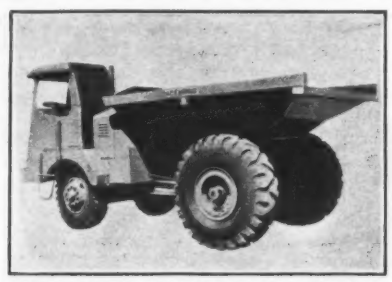
A folder listing over 25 items of construction equipment is being distributed by the Isaacson Iron Works, 2917 E. Marginal Way, Seattle 14, Wash. Among the items covered are the Isaacson Trac-Dozers, Kable power units, Klearing dozers and bladers, Brush Kutters, snow plows, hoists, rooters, rollers, etc.

Each item is illustrated and is accompanied by a short description of its application. Principal features are pointed out, and other data of interest.

Copies of this literature may be obtained from the company. Or use the enclosed Request Card. Circle No. 115.

Off-Highway Hauler Has 12-Yard Capacity

Displayed for the first time at the Road Show this past July, the Rocktor rubber-tired off-the-road hauling unit has a heaped-load capacity of 12 cubic yards. It was developed especially for heavy-duty rock hauling by the Koehring Co., 3026 W. Concordia Ave., Milwaukee 10, Wis., and as a teammate for the new Koehring 1005 excavator, a 2½-yard unit.



Heaped-load capacity of the Rocktor diesel-engine-powered hauling unit is 12 cubic yards. It is designed especially for use in heavy-duty off-the-road rock hauling.

The Rocktor is powered by a 6-cylinder 150-hp diesel engine, and has five forward speeds up to 30.1 mph and two reverse speeds. The dump body of the unit is 10 feet wide and has a rocker type of mounting. Double-acting twin hydraulic cylinders boost it to dump position at a 70-degree angle. A 135-inch wheelbase permits a 26-foot turning radius. The three-point suspension design and free-oscillating steering axle eliminate damaging body strain, Koehring points out.

Other features of the unit which are stressed include: all-welded and reinforced body construction, a constant-mesh transmission of special design, a roller-mounted twin-lever Ross steering gear, a Vickers hydraulic booster, an internal gear-type jaw clutch, heavy-duty axles mounted on anti-friction bearings, and a positive air-braking system.

Further information may be secured from the company, or by using the enclosed Request Card. Circle No. 9.

Green Upped by Salt Co.

Edson K. Green is the new General Sales Manager of International Salt Co., Inc., of Scranton, Pa. Mr. Green has been Assistant Sales Manager of the company since 1945.

RUGGED-STURDY Performers

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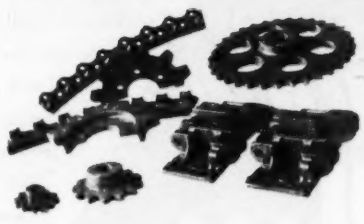

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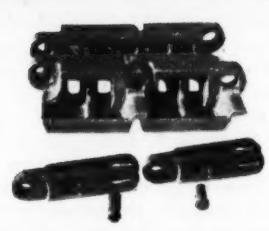

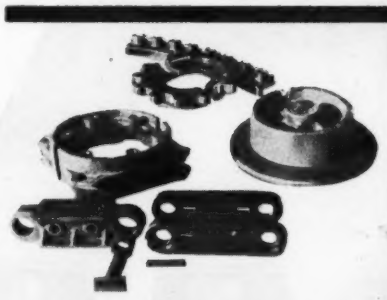

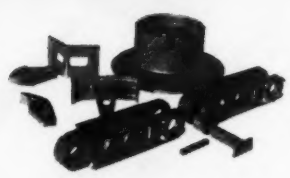

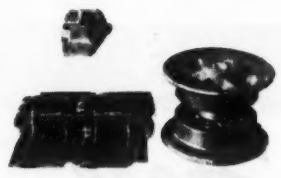

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Survey Correlation Speeds Road Plans

Maps Referenced to Common System Reduce the Duplication of Surveys; Aid Selection of Alternate Routes; And Cut Down Amount of Field Work

COORDINATING survey and map data to a common system of horizontal and vertical control is of great help to the highway planner. The use of a plane coordinate system, and its advantages in highway work, was discussed at the January conference of the American Road Builders' Association. A report on how to formulate and use this type of control was presented by B. Everett Beavin of the J. E. Greiner Co., Baltimore, Md.

What is this plane coordinate system, and how does it work? For years, said Mr. Beavin, engineers have referred levels to mean sea level as the datum plane for vertical controls. But little has been done about controlling surveys from a horizontal datum. This is not hard to do, he said, and it would provide several advantages. In fact, an easily available plane for such a system is the state coordinate system.

One advantage of such a system is that the surveys conducted by individual agencies can be combined on one map, thus giving the advantages of each to all. And in many cases, the need for taking a new survey over areas already covered by a different agency is eliminated. Another advantage is that all discussion can be referred to a common denominator, and it is unnecessary to pull innumerable maps from the files when a discussion on a certain section is under way.

Setting Up the System

Now then, how would one go about setting up such a system? Mr. Beavin stated that coordinated maps are the logical starting point. Recent Government maps have the state grid ticked off along the sides. Or, in the case of older maps, tables giving latitudes and longitudes at 15-minute intervals are available, or may be computed. Grid lines are inked on the maps at 5,000 or 10,000-foot intervals which then are blown up to a scale of 1-inch-equals-1,000-feet, or larger. Before making any prints from these maps, all existing horizontal and vertical controls should be drawn on the map. Also, it is a good idea to show all coordinates and outlines of the maps of other agencies and to outline or refer to them by notes.

A convenient scale for maps, if new ones are to be made, is 1-inch-equals-200-feet, with contour intervals set at 5 feet. With this scale, an accuracy of one-half a contour interval is possible. Many aerial-mapping companies will perform the necessary ground surveys to control the accuracy of the maps. Or, if preferred, the control can be furnished by the highway department, using triangulation, traverse, 3-point stations, or any combination of these, establishing stations for future final surveys at the time the picture points are coordinated.

Advantages for Planning

Once these coordinated maps have been established, the entire program of highway planning can be greatly simplified. For example, Mr. Beavin stated, it will be possible to study a number of alternate routes with numerous variations and combinations, without sending survey parties into the field. There will not be that inevitable rise in property values before the right-of-way is purchased, caused by the appearance of survey parties. Studies during this period can also include approximate designs and estimates of drainage structures, interchanges, and consideration of soil types. This is particularly economical and desirable where highways cross rivers, piers, railroad yards, and all the other obstacles frequently encountered. It also eliminates much of the necessity for plugging lines through at expense of time and money.

If the mapping is accurately controlled, the alignment finally adopted may be described and fixed by coordinates so closely that field work is reduced. Points on the roadway may be set in from any near-by coordinate station and re-set as often as may be necessary. If one works with coordinates, center lines need not be established until the time of construction, thus eliminating the troubles caused by plugging through. For quantity of earth work, most engineers prefer to cross-section the work. But there are places, especially at interchanges, where a coordinated contour map—to a scale of 1-inch-equals-50-feet and a contour interval of 1 foot—affords a better opportunity for accurate computation of

(*Concluded on next page*)

HOT or COLD *Mix Asphalt*

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AIR WASHERS
ASPHALT TANKS
OIL TANKS
PUMPS

SIMPLICITY ASPHALT PLANTS

FEEDERS
DRYERS
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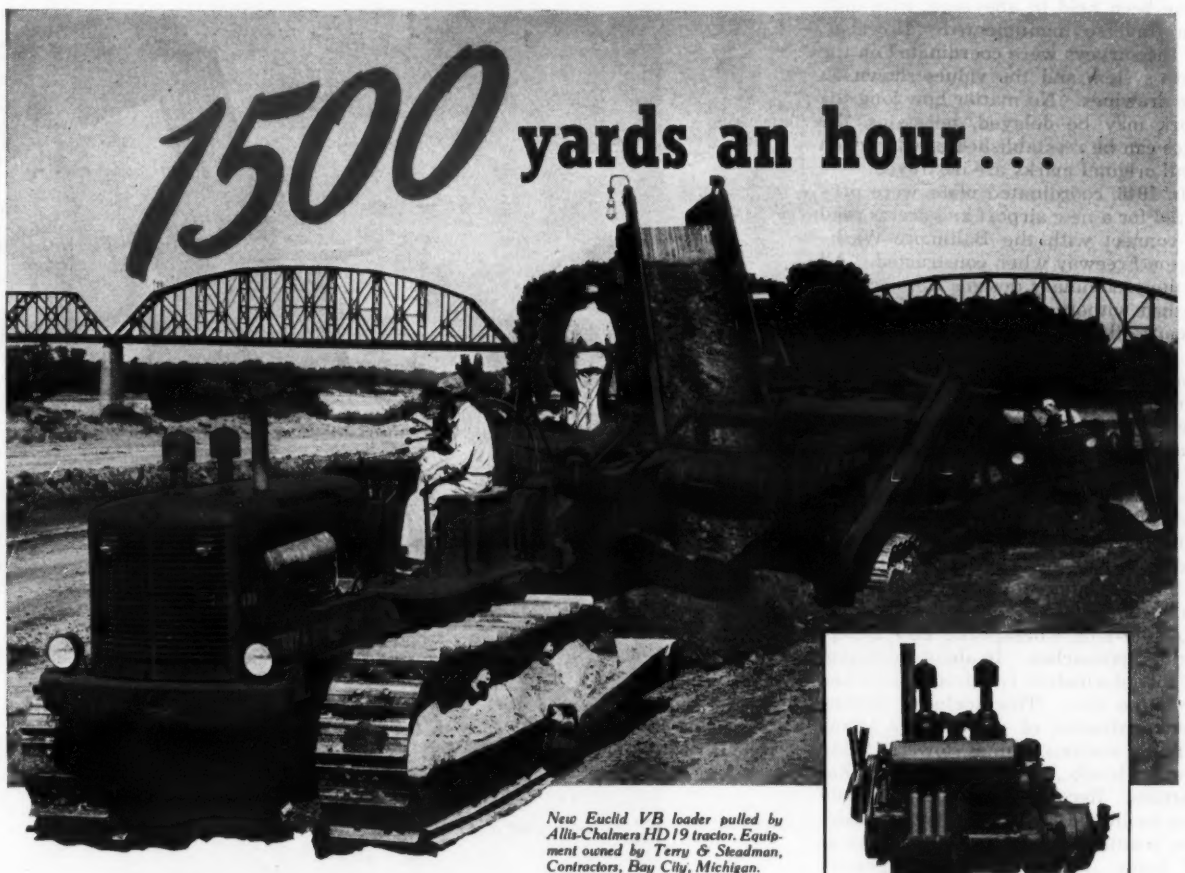
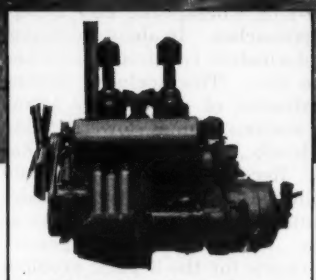
DEPENDABLE

THE SIMPLICITY SYSTEM COMPANY
CHATTANOOGA, TENNESSEE, U.S.A.

1500 yards an hour...



New Euclid VB loader pulled by Allis-Chalmers HD 19 tractor. Equipment owned by Terry & Steadman, Contractors, Bay City, Michigan.



General Motors Series 71 Diesel Engine as adapted by Allis-Chalmers for the HD 19 tractor.

24 hours a day

WHEN this Euclid VB loader and Allis-Chalmers HD 19 tractor went to work on the Louisville, Kentucky levee project, the dirt really began to fly—1500 cubic yards an hour, 24 hours a day.

"Almost double the amount other types of equipment move," the superintendent tells us. And no wonder! For the HD 19 boasts a wealth of smooth, dependable General Motors Diesel power.

Because the GM Diesel engine operates on the 2-cycle principle, it provides power at every downstroke. So the "six" performs like a "twelve"—turning out more work and sticking to it longer.

Whatever your need for power may be, it will pay you well to standardize on General Motors Series 71 Diesels. Not only are they frugal with fuel, but these engines are long-lived, durable workers that are easy to maintain. And you get an added bonus of parts interchangeability between engines of different sizes. See your local dealer, or write directly for further details.

DETROIT DIESEL ENGINE DIVISION
SINGLE ENGINES.. Up to 200 H.P. DETROIT 28, MICHIGAN MULTIPLE UNITS.. Up to 800 H.P.
GENERAL MOTORS

DIESEL BRAWN WITHOUT THE BULK

GM GENERAL MOTORS DIESEL POWER

Survey Correlation Speeds Road Plans

(*Continued from preceding page*)

quantities.

During construction of the highway, coordinate stations off the center line may be used for reestablishing the highway lines as often as they become destroyed. After the construction is finished, they perpetuate the location of party lines, making unnecessary the wholesale monumenting of the corners. Many of these property markers are destroyed after a short time, so it seems advisable to perpetuate the control survey and reestablish property corners and other points on the roadway only when circumstances permit.

The System in Use

Mr. Beavin pointed out several specific instances in which he has used this system to advantage. One of these concerned plans which were prepared in 1944 for the Washington-Baltimore Freeway, between Jessups and a point near the Patapsco River. These plans have been held in abeyance, with only the traverse monumented. However, all the surveys were coordinated on the state system and the values shown on the drawings. No matter how long the work may be delayed, he states, the lines can be reestablished exactly, even if all original marks are destroyed.

In 1946, coordinated plans were prepared for a new airport and access road to connect with the Baltimore-Washington Freeway when constructed. All of the preliminary designs were accomplished without any field work, simply because the coordinate system is a tie in itself. The Maryland State Roads Commission is now studying several modifications of the Baltimore end of the Freeway; and, as pointed out in this article, information is readily exchanged by telephone by mentioning only a few coordinates. This would have required sketches, prints, and field work if all the data had not been coordinated on a standard state-wide system.

Another interesting case occurred in connection with a survey begun for a 4½-mile-long Chesapeake Bay Bridge and its approaches. In about 5 minutes, all the information required was picked from the files. This included finding the coordinates of all near-by triangulation stations, domes, towers, lighthouses, bends in channels, and other features. Reconnaissance in the field was facilitated, as it was easy to ascertain positions from these landmarks at all times. In a few days, graphical-solution charts for the 3-point problem were prepared, and the position plotted almost instantaneously, without the use of 3-arm protractors, drawing boards, or other devices.

Using a boat equipped with a sonic depth finder, and aided by these charts, soundings were taken in a few days in water up to 90 feet deep. This operation would normally require several weeks. Accuracies obtained were found to be satisfactory. This method also eliminated the necessity for survey parties to stand by for long periods at shore stations to cut in the soundings.

As Mr. Beavin summarized it, "To be in a position to realize these benefits, the engineer must think in terms of coordinates through the various states of conception of the project, preliminary or advance planning, aerial surveys, and final determination of the alignment, final surveys, property acquisition, construction, and maintenance and operation for the life of the project".

Construction Machinery

A catalog listing the complete White line of machinery for road construction and maintenance has been put out by the White Mfg. Co., 1227 W. Beardsley Ave., Elkhart, Ind. Catalog No. 32-C contains 20 pages of information on such equipment as asphalt plants, pugmill mixers, pavement-repair trucks, heaters and pouring kettles, driers, concrete vibrators, concrete grinders, tractor shovels, sprayers, traffic-lane markers, and others.

Each piece of equipment is illustrated, and text describes its operation and features. Where a piece of equipment is made in several models, complete specifications are given for each unit in the line. The catalog is indexed for rapid location of any specific type of equipment which White manufactures.

Copies of this literature may be obtained from the company. Or use the enclosed Request Card. Circle No. 116.

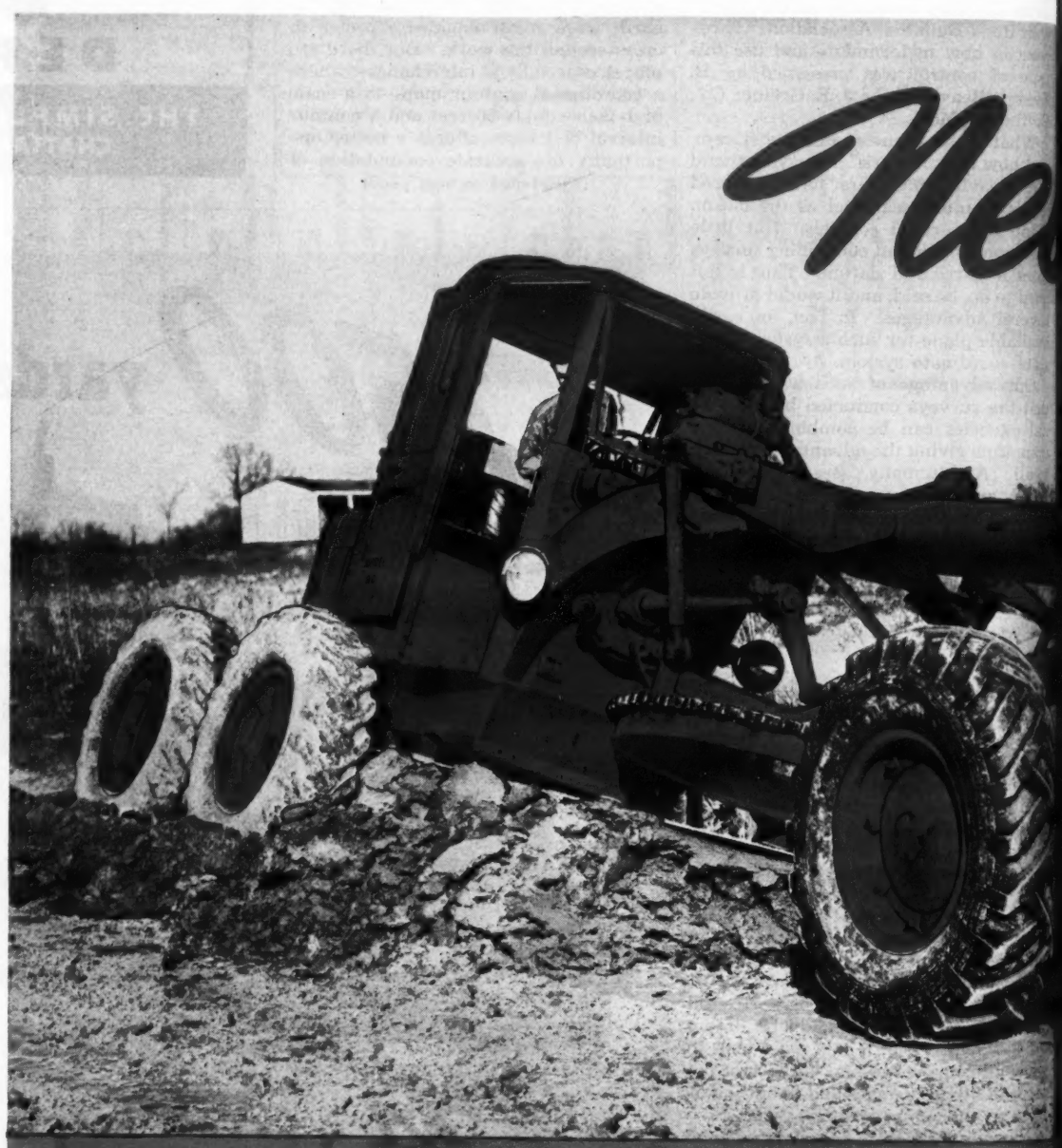
New Officers Elected For Snare Corporation

The Frederick Snare Corporation, Engineers and Contractors, has announced the results of its election of officers. Arthur W. Buttenheim was elected Chairman of the Board after serving for 21 years as the President of the company. He fills the post left vacant by the death of Frederick Snare, founder of the company bearing his name.

Mr. Buttenheim is succeeded as President by George P. Seeley, who has been with the company for 39 years. And Harry O. Ware, who was formerly with the Export-Import Bank of Washington, D. C., has been elected Secretary and Treasurer.

Vice Presidents are Randall Cremer, Manual Gamba, Robert R. Ellis, Jr., and Edwin R. Akers. John Bakelaar and John F. Myslik have been named Assistant Secretaries and Assistant Treasurers. Also serving on the Board of Directors are Ferdinand J. Litter and Frederick S. Peters.

In addition to its main office at 233 Broadway in New York City, the Frederick Snare Corporation has branch offices in Philadelphia, Pa.; Havana, Cuba; Caracas, Venezuela; Bogota, Colombia; Lima, Peru; San Juan, Puerto Rico; and Guayaquil, Ecuador.



Relief for Limited Budgets

This Model W-Speed Patrol handles regular maintenance and light construction for a fraction of the cost of large motor graders. Enables you to spread your upkeep dollars over more miles of roads and streets. And you get IMMEDIATE DELIVERY!

- Engine—31 brake hp.
- Weighs 5,960 lbs.
- 10 ft. blade — adjustable pitch
- Electric lights and starter
- Blade pressure 4,780 lbs.
- Short turning radius for narrow roads, streets and alleys
- Averages about one gal. of fuel an hour
- Works at 3 to 5 m.p.h. — travels up to 10 m.p.h.
- Drawbar always free

Data on Lubricant Line

A folder on lubrication of trucks and other rolling equipment has been prepared by the Lubriplate Division of the Fiske Bros. Refining Co., 129 Lockwood St., Newark 15, N. J. It discusses the reasons for using lubricants and explains how Lubriplate products form a film designed to reduce friction, to protect against rust and corrosion, and to perform other services required of greases and oils.

The folder lists the features and recommended uses of its Nos. 2, 8, 70, 107, 130-AA, and ball-bearing lubricants for use with construction equipment. It also tabulates the various moving parts in this type of equipment, and indicates the grade of lubricant required for each. The folder describes the Fiske Bros. packages and lists dealers throughout the United States and Canada who handle the Lubriplate line.

Copies of this literature may be obtained from the company. Or use the enclosed Request Card. Circle No. 53.

Bucket Points, Adapters

A catalog describing the new Esco box-type bucket points and adapters can be secured from the Electric Steel Foundry, 2141 N. W. 25th Ave., Portland 10, Oreg. These are made in a wide range of sizes and styles to fit most makes of dipper, backhoe, and dragline buckets, as well as rippers.

Catalog 162-A shows how the points are removed and replaced, how they are designed to absorb shock and make a tight fit, and how the point and adapter are locked together by means of the tapered locking pin and rubber keeper. Among the features claimed for these points are a high tensile strength and wearing quality, wear-resistant cutting edges, and ease and speed in removal and installation.

Tables list the complete line of adapters and points, telling the type of bucket for which each is designed. They also list the points which can be used with each adapter, and figures concerning dimensions, weights, etc.

Copies of this literature may be obtained from the company. Or use the enclosed Request Card. Circle No. 112.

Col. Pettit Opens Office

Col. Homer B. Pettit has retired from the Corps of Engineers, United States Army, after 30 years of commissioned service. He has opened a consulting-engineer office in Suite 610, Stoneleigh Court, 1025 Connecticut Ave. N. W., Washington 6, D. C.

AD-4

A HEAVY-DUTY Motor Grader for HEAVY WORK

Everything You Want in a Motor Grader!

POWERFUL — 104 brake hp. . . . famous General Motors 2-Cycle Diesel Engine . . . dependable, economical, instant-starting.

HEAVY — 22,140 lbs. effective weight . . . balanced for maximum traction and control.

STRONG — exclusive tubular frame . . . absorbs shocks, protects control rods inside frame.

ACCURATE — blade held firmly on road through direct down pressure . . . cuts smoothly, within fraction of inch of desired depth.

HIGH CLEARANCE — over 30″ throat clearance for handling bigger windrows without interference.

TRAVEL SPEEDS smoothly synchronized with operator controls . . . all the needed power applied as required.

"ROLL-AWAY" MOLDBOARD — less power required to handle bigger windrows at faster speeds. Material is rolled, not pushed.

FULL CIRCLE REVOLVING BLADE — swings *ahead* of platform with plenty of end clearance.

FULL RANGE OF BLADE POSITIONS . . . plus leaning front wheels, for handling all types of grading with ease. Blade can be shifted, too, to a maximum of 40″ right or left.

ELECTRIC BRAKES — control positive, operate with less effort than auto brakes.

PLUS . . . Easier Steering, Larger Clutch, Electric Gauges, Full Visibility and many other outstanding advantages.

★ **Other Diesel-Powered Sizes**
Model AD-3.....76 brake hp.
Model BD.....50.5 brake hp.
(Same Proved Design As AD-4)

• • •

★ **Gasoline-Powered Motor Grader**
Model W-Speed Patrol
(see photo and description at left)

ALLIS-CHALMERS
TRACTOR DIVISION • MILWAUKEE 1, U. S. A.

Three Bridges Built Along Old Mill Site

Concrete-Slab Structures Included in One Contract In Rhode Island; 14-Mile Haul for Truck-Mixers

By WILLIAM H. QUIRK,
Eastern Editor

✦ THREE new reinforced-concrete-slab bridges have been completed on State Route 112, the Richmond Town House Road, in Washington County, R. I. The job was done by the General Engineering & Contracting Co., Inc., of Providence, R. I., for $119,327, the low-bid contract to the Rhode Island Department of Public Works, Division of Roads and Bridges. Work started in August, 1947, and by the end of the year the concrete work was completed. The bituminous paving on the approaches, however, was left to the present construction season.

The new bridges replace three old and narrow spans which were built back in 1907 by the American Bridge Co. in connection with the development of a mill area just north of the village of Carolina. Woollen, saw, and grist mills are located at this site where the Pawcatuck River has been dammed to create a mill pond whose waters furnish the mills with the necessary power. The millpond lies east of the road which was built to give access to the mills, and which at this point runs nearly due north and south.

The three old bridges had piers and abutments of field stone with structural-steel superstructures supporting wood-plank decks. Two were of I-beam construction, while the third was a combination of a truss and I-beams. The roadway width on the bridges was only 16 feet. Some time after the original construction of the bridges and access road to the mills, the State acquired the property as part of its secondary highway system, and put on a blacktop pavement 18 feet wide. There were several accidents at the narrow bridges and this was one of the prime reasons for replacing them with the present modern structures.

Three New Bridges

The total length of the project is only 625 feet, with 135 feet between the center lines of the north and middle bridges, and 223 feet between the middle and south bridges. All the structures are designed for H-20 loading. They have 34-foot roadways between curbs, with a 5-foot walk on each side protected by a 3-foot 3-inch bar-type concrete railing. The approach roads and the connecting links between the bridges also have a 34-foot pavement, consisting of an 8-inch gravel foundation course over which a 5½-inch stone base course is laid. This is topped by a 2½-inch bituminous surface bordered by granite curbs and flanked by 6-foot shoulders.

Bridge No. 54, the northerly of the three structures, carries the road over the mill trench which is an open conduit for water flowing from the millpond on the east side of the road to the mills on the west side. This is a fixed bridge on a 7-degree skew, with two abutments and a single 25-foot span.

Bridge No. 55, the middle structure,

(Continued on next page)

C. & E. M. Photo

Here is bridge No. 56 showing the north abutment and center pier already built, but the footing excavation for the south abutment flooded after a heavy storm which broke the millpond dam. Later the dam was rebuilt, the water pumped out, and work resumed.

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BERGER TRANSITS, LEVELS, ALIDADES and COLLIMATORS
have engineered with unfailing accuracy and eliminated costly errors on Roads, Highways, Building Construction, Bridges, Dams, Hydroelectric Developments and Geological Surveys and Maps as well as thousands of other projects of distinction, large and small.

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BUZKA Transit

Engineers Specify BERGER Instruments for:
Absolute concentricity of centers • Graduations of unsurpassed accuracy on Sterling Silver • Permanency of line of collimation • Consistent performance under all climatic conditions • Optics of highest precision.
The BERGER Jig Collimator is used daily in toolrooms, aircraft production, by machine tool manufacturers, for alignment of assemblies and for many other purposes of industry.

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First made in 1871, BERGER Engineering and Surveying Instruments are recognized the world over as symbols of perfection and precision. They are used with complete success in the greatest engineering achievements because of their unfailing accuracy and dependability.

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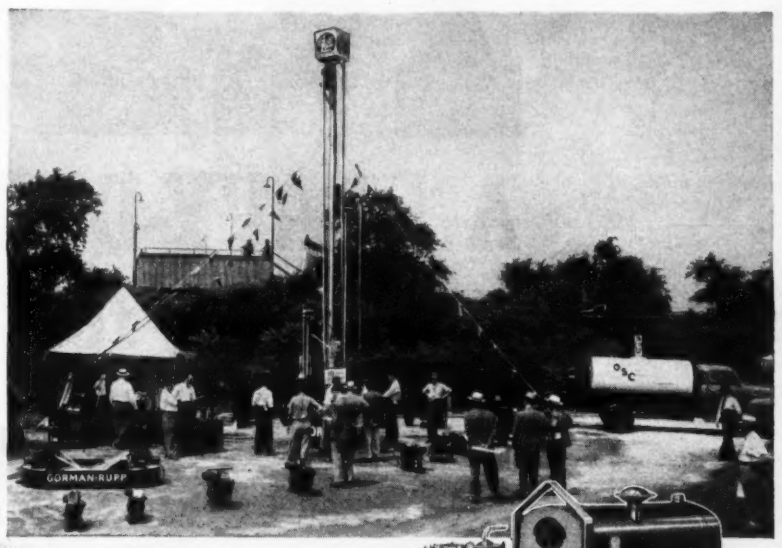
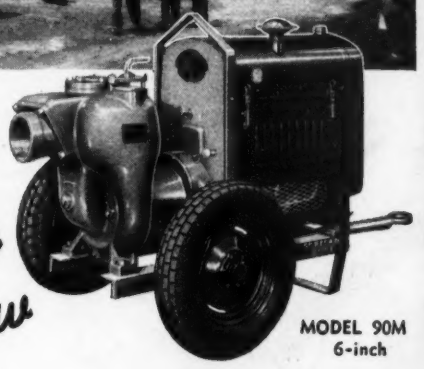


GORMAN-RUPP "Steals" the Pump Show



MODEL 90M
6-inch

----- AT THE ROAD SHOW !

Contractors and distributors alike were amazed at the outstanding performance of Gorman-Rupp pumps at the Road Show. Here they saw the highest priming, fastest priming and pumping demonstration on the grounds.

There is a Gorman-Rupp distributor in your territory. He will be glad to demonstrate to you the outstanding all around performance of the new Gorman-Rupp pump . . . still the most dependable pump. He will gladly provide you with our new catalog, Form 8CP-11 that tells in detail about these new pumps.

If you do not know the Gorman-Rupp distributor in your territory, write to us. We will provide full information.

Mr. Contractor!
You cannot afford to start a new job without the new GORMAN-RUPP pump to keep the hole dry and costs down.

All Sizes: - 7M - 10M
15M - 20M - 30M - 40M
90M - 125M

THE GORMAN-RUPP COMPANY
MANSFIELD, OHIO

and bridge No. 56, the southerly span, are similar in design. Both are 50 feet long, with two 25-foot spans supported on two abutments and a center pier, and are on a 12-degree skew. On top of the piers are 1-inch expansion joints. The substructures are built on a gravel foundation; the abutment footings are 47 x 9 x 3 feet deep, and the pier footings 42 x 5 x 3 feet deep. The abutments and piers are 2½ and 2 feet wide respectively, and average 15 feet in height. The flat-deck slabs, without beams, average 19 inches deep.

The center bridge, No. 55, crosses the spillway from the millpond dam, and No. 56, the southerly span, carries the road over the Pawcatuck River which flows west from the pond.

Same Location

Because the new bridges are in the same location as the old ones, the contractor had to build a detour for traffic immediately west of the original line and erect some temporary drainage structures. A wooden culvert to take the spillway flow was constructed next to bridge No. 55, while temporary wooden bridges were erected alongside the other two structures. Then the original spans were demolished, first at 54 and 55 to make way for the new bridges, followed by No. 56. The masonry substructures were easily razed by a Byers 83 crane equipped with a 55-foot boom and a Williams ⅝-yard clamshell bucket.

During the work at bridges 54 and 55, the late summer and autumn were fairly dry, and the flow from the millpond was entirely diverted through the river channel under old bridge 56 which was still left in place. Thus all the substructure construction on the upper two bridges was done in the dry. The excavation for the footings was done either by the crane or by a Marion ¾-yard backhoe.

Forms and Concrete

Wooden forms for the piers and abutments were made up from ⅝-inch plywood backed with 2 x 6 studs on 12-inch centers, and strengthened further with double 2 x 6 wales on 2-foot 6-inch centers. Most of the form work was cut on a CMC table saw. The panels were tied together with Universal ½-inch threaded rods. The deck-slab forms were supported on a falsework composed of three bents to a 25-foot span. Each bent contained 6 x 6 posts on 4-foot 6-inch centers across the full width of the bridge. The posts were capped with 6 x 6's supporting 4 x 12 stringers on 18-inch centers. Across the stringers ⅞-inch boards were laid for the bottom deck form.

Although only half the deck width was poured at a time, the forms were made up for the full width of bridge. The Plantation Steel Co., of Providence, R. I., furnished the reinforcing rods bent to the proper shapes. They were delivered to the job by truck, a haul of 35 miles.

All concrete for the jobs was supplied by the Pawtucket Ready Mixed Concrete Co., of Pawtucket, R. I., which delivered the mix in Smith 5-yard truck-mixers from its plant at Frenchtown, R. I., 14 miles away. As the pours were small, only four truck-mixers were required at any one time. Some water was put in with the Lehigh cement, sand, and crushed gravel at the batch plant, and the remainder was added from the mixer tanks when the job was reached. The total mixing and agitating time ranged from ½ to ¾ hour.

On the low pours the concrete was chuted or bucketed into the forms. On high pours the concrete was discharged into an Insley ¾-yard bucket which was lifted over the forms by the crane and emptied into a hopper equipped with elephant-trunk pipe. Held in reserve for emergencies was a Koehring Dandie 2-bag mixer along with small stockpiles of fine and coarse aggregate and an adequate supply of bag cement. In case anything happened to the flow of concrete from the truck-mixers, a pour already started could readily be finished.

The Mix

Class A concrete, mixed in the proportions 1 : 2.2 : 3.8, was used in the bridges. The weights as figured for 1 cubic yard of concrete were as follows:

Cement	526 lbs.
Sand	1,362 lbs.
Crushed gravel, ¾-inch	1,033 lbs.
Crushed gravel, 1½-inch	1,033 lbs.
Water	34 gals.

The usual slump for this mix was 1½ to 2 inches. The gradation of the sand and gravel was as follows:

Sieve Size	Per Cent Passing	
	Crushed Gravel	Sand
1½-inch	90-100	....
¾-inch	40-65	....
⅜-inch	5-15	....
No. 4	....	95-100
No. 20	....	40-75
No. 50	....	10-30
No. 100	....	3-8

(*Concluded on next page*)

C. & E. M. Photo

Reinforced-concrete approach slabs were built at the end of each bridge span to prevent jolts to cars leaving the approach fill to get on the bridge. Here a Smith 5-yard truck-mixer delivers concrete for the bridge No. 55 southeast approach slab.

THIS ONE MAN WAGON DRILL

gives more footage in less time

EASILY MOVED FROM HOLE TO HOLE

Pneumatic-tired wheels make handling easy. Wheel brackets may be interchanged, reducing wheel gauge from 51" to 36" for drilling on narrow benches.

QUICKLY SET UP AT ANY ANGLE

Drill guide is mounted on a universal type saddle, making it extremely flexible and allowing drill to be set at any angle to the cross bar.

LONG DRILL FEED—POSITIVE LOCKING BRAKES

Too frequent drill changes are eliminated by the long drill feed. No anchor pins are necessary—a spin of the brake wheel locks brakes tightly allowing no movement of the carriage.

JOY ROCK DRILLS

WAGON DRILLS • AIR COMPRESSORS

W&D C-1306

SULLIVAN DIVISION

JOY MANUFACTURING CO.

GENERAL OFFICES: HENRY W. OLIVER BLDG., PITTSBURGH, PA.

C. & E. M. Photo
At bridge No. 54—the northerly of the three new structures at Carolina, R.I. —a Byers 83 crane with a 55-foot boom and a Williams ¼-yard clamshell bucket backfills at the north abutment.

Three Bridges Built Along Old Mill Site

(Continued from preceding page)

Concrete Approach Slabs

Drainage through the abutments was taken care of by weep holes, combined with a 2-foot-wide strip of gravel backfill extending from the bottom to the top across the entire structures. This material was dug from a pit about ½ mile from the job site by either of the two excavators on the job, and loaded into a couple of 4-yard trucks. It was stockpiled alongside the bridges, and filled in later by the crane and clamshell.

To prevent a bump or jolt as a car leaves the approach fill to get on the bridge, a reinforced-concrete approach slab was constructed at the end of each span. The slab is 14 inches thick and 14 feet long, extending the full width of the structure. At one end it is supported on the abutment, while the rest of its area rests on both the gravel backfill and the approach embankment. By thus bridging over the fill, any depressions from settlement are avoided.

After bridges 54 and 55 were completed, the water from the pond was diverted back through the mill trench or over the spillway so that the main river bridge, No. 56, might be constructed in the dry if possible. The old dam was also reinforced against a break-through by throwing up an earth embankment behind it. A couple of Rex 4-inch pumps unwatered the site, permitting the construction of the north abutment and center pier. The backhoe had begun digging the excavation for the south abutment footing when southern New England was hit hard by a heavy wind and rain storm on November 12. The old dam, even with the embankment surrounding it, gave way, flooding the river-bridge site. When the water subsided after the storm, the earth dike was rebuilt, the hole pumped out, and the south abutment completed. Work on the superstructure then followed. The concrete was cured with water pumped from the pond by a 2-inch pump.

Quantities and Personnel

The major items included in the three-bridge contract were as follows:

Excavation	4,261 cu. yds.
Concrete	1,253 cu. yds.
Reinforcing steel	127,629 lbs.

The General Engineering & Contracting Co., Inc., of Providence, R. I., employed an average work force of 14 on the project under the direction of Superintendent Joe Hemberger. Included were an excavator operator and oiler, 2 masons and helper, 4 carpenters, and 4 laborers. Hugo R. Mainelli, President of the contracting firm, also gave the job his close attention.

For the Rhode Island Department of Public Works, Milton W. Gardiner was Resident Engineer. The Department is headed by George H. Henderson, Principal Highway Engineer; Daniel O. Cargill is Bridge Engineer, Joseph A. Russo is Bridge Construction Engineer, and Lee V. Spencer is Road Construction Engineer.

Platform Trailers In Two Capacities

Platform trailers in 18 and 30-ton capacities are manufactured by American Body & Trailer, Inc., 1500 Exchange Ave., Oklahoma City, Okla. These semi-trailers are offered in both single and tandem-axle models. Both are nose-loaded, and are connected to the tractor by using a winch line.

The single-axle Model SF-42 is built in two sizes, 26 and 28 feet long inside the front and rear tailboard. It has an 8-foot overall width, a level platform height of 48½ inches, and a capacity of 18 tons. It uses 10:00 x 20 tires. It has a 2-inch oak deck and an optional 36-inch-diameter semi-automatic lower fifth wheel. It has an approximate weight of 6,760 pounds for the 26-foot size, and 6,940 pounds for the 28-foot size.

Platform trailers in single-axle and tandem-axle models, with capacities of 18 and 30 tons, are made by American Body & Trailer, Inc.

The tandem-axle Model SF-42-T is also made in two lengths of 26 and 28 feet. It has an overall width of 8 feet, a platform height of 51¼ inches, and a capacity of 30 tons. It uses 10:00 x 20 tires, has a 2-inch oak deck, and a 36-inch-diameter semi-automatic fifth wheel. Weight of the 26-foot size is 10,310 pounds; the 28-foot size weighs 10,530 pounds.

Further information may be secured from the company, or by using the enclosed Request Card. Circle No. 37.

Sales Mgr. for Universal

L. H. Crafts has been named Vice President and General Sales Manager of the Universal Motor Co. of Oshkosh, Wis. He has been associated in the past with the Buda Co., Sterling Engine Co., Curtis Marine Co., Inc., and the Lycoming Mfg. Co.

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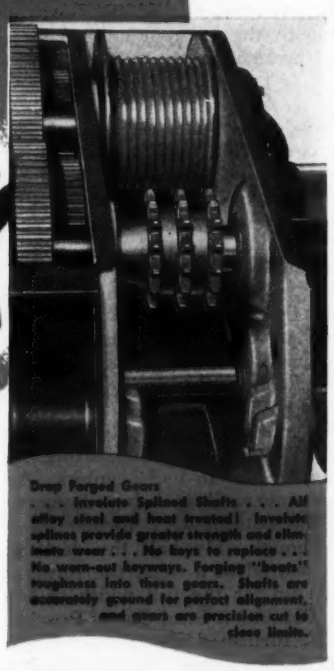

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Dredge Vicksburg Builds Highway Fill

Hydraulic Embankment Pumped and Deposited By Pipe Lines to Form Interstate Road Link

By RAYMOND P. DAY,
Western Editor

TEXANS' fondness for water was widely publicized when Fleet Admiral Chester W. Nimitz was placed in honorary command of the Texas Navy. But a fact not so well known is that the Texas Highway Department, too, has recently taken to the water.

Under a $433,512 contract with the Texas Highway Department, the 20-inch hydraulic dredge Vicksburg has built a vital 1.281-mile link in the Houston-Port Arthur section of Interstate Route 73, near Anahuac, Texas. McWilliams Dredging Co. of New Orleans had the 260-calendar-day contract, which began on August 26 last year. The new high fill to carry the new highway across the Trinity River bottomlands near its mouth was scheduled for completion by May 15 of this year.

The contract included 80 acres of clearing and grubbing; 1,692,000 cubic yards of hydraulic stripping with the dredge, both in the borrow area and under the embankment location; and some 927,810 cubic yards of clay and sand fill contained in the highway embankment.

Known as first-stage construction, the project provides a fill about 12 feet high. Later, the flexible base and pavement will be laid. The job will also tie in with two bridge crossings of the Trinity River which are due for future construction.

Embankment Design

The new embankment is 72 feet wide at the top, with 6 to 1 side slopes fairing away to low ground on either side. The top 36 inches of this embankment was made with select sand. Hydraulic stripping under the embankment area removed an average 15-foot layer of objectionable soft mucky clay, and the dredged embankment averages 28 feet in height from the stripped depth to the top of fill. Subsidence plates were placed every 100 feet to check the settlement.

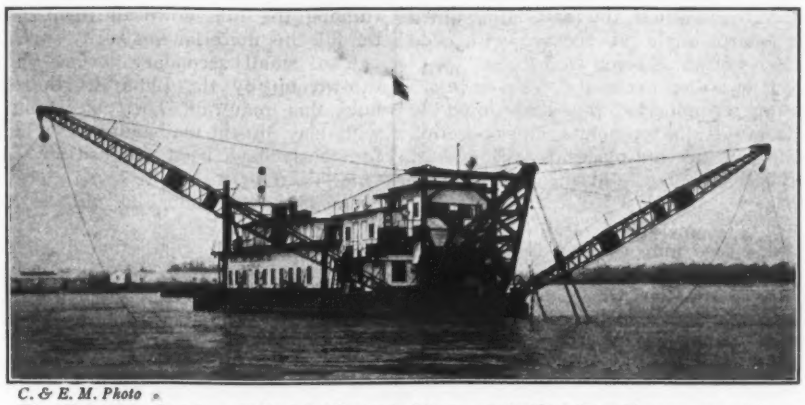
At the Trinity River bridge location, the embankment widens out to 108 feet to meet the new 4-lane bridges which will be built later on.

Since the contract did not specify densities on a fill of this kind, it is expected that at least 6 months will elapse after completion before work can be started on the sub-base.

Preparing for Dredging

Extensive preparatory work was necessary before actual dredging could get under way. The borrow area was covered entirely by light brush, some trees, and about 9 feet of objectionable muck, all of which had to be removed.

A Caterpillar D7 tractor with a LaPlant-Choate blade and an International TD-18 with a Bucyrus-Erie hydraulic-controlled bulldozer blade came in to work on the brush. With good ground conditions underfoot, the machines hurried along to clear the brush away. It was heaped in big piles at a location outside the limits of the borrow area.



C. & E. M. Photo

The Vicksburg has two 65-foot latticework booms projecting from the corners of her hull near the ladder, which are used to set her swing anchors ahead.

At the same time, while this work was under way, a Lima 802 dragline with a 3½-cubic-yard Hendrix perforated bucket moved in to build levees. It had been decided to enclose the fill with heavy-clay levees, built up to elevation plus 12.

The Lima rig started working on the first levee, digging out objectionable muck and replacing it with the heavy clay. Much of the time this machine worked on pads, especially towards the Trinity River end of the job. With only three weeks to go to finish the levee building job, some trouble developed on the swing-circle rollers. Simultaneously, the general superintendent was advised to prepare for flood stages on the Trinity River in the very near future.

Deciding to gamble, he kept the Lima working. Building levees at the rate of 600 feet in 8 hours, the machine nosed out just ahead of the high waters. The necessary repairs were then made, which required enough time to justify the gambling decision previously made.

The clay levees were built about 120 feet apart, and raised to elevation 12. When they settled, the top elevation averaged about 10.5.

(*Continued on next page*)

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Dredge Vicksburg Builds Highway Fill

(*Continued from preceding page*)

Dredge Moves In

With the borrow area cleared of trees and brush, and the embankment location enclosed by levees, the 20-inch dredge Vicksburg made its way under tow up the fast-flowing Trinity River. When she reached a point opposite the designated borrow-pit site, she dug a narrow entrance channel in to the borrow pit.

Taking 200-foot-wide cuts, she then stripped off an average of 9 feet of the top muck, discharging it through her pipe line to a spoil bank well outside the highway embankment limits. She removed the muck down to the stratum of hard blue clay which state highway engineers had previously located with their exploratory borings.

A narrow connecting channel was then dug between the borrow area and the embankment. When this channel had been dug to the far side of the highway, the Vicksburg turned 90 degrees and began to dig within the area enclosed by the two levees. All the unstable, mucky ooze was pumped out. Special precautions were taken to get every bit of this material out from under the proposed highway, and when the dredge had finished, there was about 15 feet of water between the levees. Strangely enough, the banks stood up fairly well under the weight of levees near-by.

This material also was wasted in the spoil dump about 2,500 feet south of the highway location. Long after this material had been deposited, it was unstable and even unsafe for men to walk on.

Embankment Methods

The Vicksburg moved back out to the borrow pit as soon as she had stripped the embankment location, and set up on the first borrow cut. It had been decided to start the fill from the westerly limit of the job, requiring a total length of about 7,000 feet of pipe line. The shore line was laid on top of the north levee all the way out to the designated starting point.

In building the embankment, the 20-inch line was run first down the center line of the job. This threw a layer of clay and clay-sand up to the elevation of the levees. However, instead of flattening out as everyone thought it would, the material assumed a sharp angle of repose, with side slopes often as steep as 3 to 1.

It was then necessary to re-trace the route, bringing two pipe lines down the fill at the quarter-points. This operation filled in the void places. By using short steel baffle plates out ahead of the discharge, and close to the levees, the shore crew trapped all the solids and did a nice job of filling to the top of the levees.

A special type of basket on the end of the discharge line dissipated the force of the solution and permitted solids to escape through the sides and bottom. By using this basket and baffle boards, the full effective yardage was generally saved within the limits of levees. At the start of the fill, before this technique was fully developed, some yardage was lost outside the levees.

With the embankment full of material to the top of the levees, the pipe line was then again shifted to the center line to permit the 3-foot layer of select sand to be deposited. Special locations within the borrow pit where sand pockets had been located were saved for this operation. Gulf-coast sand is a very fine material, with a high percentage of No. 200 particles, and it stands on about a 20 to 1 slope when dumped from a dredge pipe line. By running the line down the center of the fill, this material was easily spread.

Also, small secondary levees were thrown up by the Lima dragline to hold this material. They were built with clay in the embankment, which previously had been dumped by the pipe line. This technique saved many a cubic yard from sloughing outside the contract limits.

State engineers and the dredging superintendent were all quite concerned about the loss of yardage outside the fill limit lines. The contractor did not want it, because it represented non-pay yardage if his borrow pit held out. The state engineers were also chary of material, because if available yardage within the 80-acre borrow pit failed to provide enough material, there was always a possibility of additional stripping. The Vicksburg can dig only about 30 feet deep.

While no finish work had been done on the embankment at the time the job was visited, plans were being made to finish off the top largely by bulldozers, with a few hours of motorgrader work.

The contract also included about 60,000 square yards of willow-mat protection on the south side of the embankment, against any wave-washing action from gulf storms. The entrance

(*Continued on next page*)

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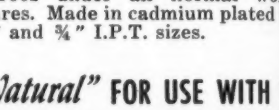

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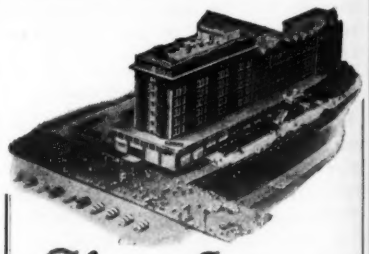

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channel to the borrow area also had to be closed up.

The Dredge Vicksburg

The Vicksburg, a 20-inch cutterhead type of hydraulic dredge, was built by the McWilliams Dredging Co. in 1938. Her steel hull is 120 feet long, 35 feet 10 inches wide, and 7½ feet deep. She draws about 5 feet of water with her digging spud down and working.

She has quite a history behind her. This is not her first highway-embankment job. She did two others, one at Port Arthur and one at Lake Charles in Louisiana. She also dredged several jobs on the Yazoo River and the Arkansas River.

Her main power plant, a huge, old 650-hp Worthington air-injection diesel engine, was at one time the only piece of major equipment owned by the McWilliams Dredging Co., according to her chief engineer. Despite many years of service before the Vicksburg was built, the engine is still giving service. The Worthington diesel drives the 20-inch centrifugal dredge pump situated amidship in the dredge hull.

Her winding gears are electrically powered, and this power is generated by a 200-hp Worthington 2-cycle diesel engine and a Westinghouse generator. A smaller 100-hp diesel electric generator does stand-by duty.

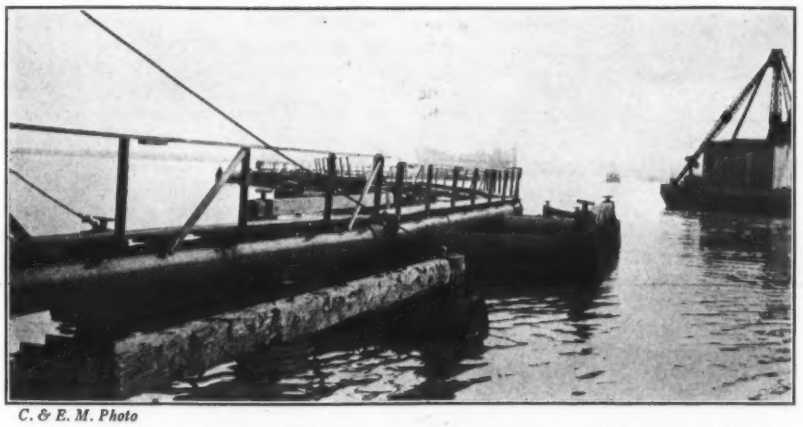
The dredge pump is a 20-inch centrifugal-type sand pump, custom-built to McWilliams' standards. It has a 63-inch runner with two vanes. Four vane impellers are also on hand, and tend to work a little better in the sandy material. Since the borrow pit was thoroughly stripped, pump shutdowns were rather infrequent. If a log was picked up, however, the pump has an inspection manhole on top of the intake pipe to permit obstructions to be removed.

The Vicksburg uses a 50-foot straight-type steel ladder, weighing about 40 tons with the intake pipe and cutter-shaft assembly installed. It can dig to 30 feet, and ordinarily leaves a depth of about 28 feet of water. A depth gage on the A-frame shows how deep the cutter is digging.

The cutter itself is a standard 5-blade basket type, about 6 feet long. The blades are hard-faced with Stoody Tube Borium rod. Clay strata were found so tough that the blades crystallized and snapped near the end hub, so it was necessary to weld a steel reinforcing ring in the center of the cutter to take the force somewhat off that part. The cutter shaft revolves at a speed of 15 rpm, driven through a gear-reduction box by a 200-hp Westinghouse motor.

Near the front of the dredge is a big 7-drum hoist, powered by a 60-hp electric motor. The Vicksburg also has two 65-foot steel latticework booms projecting from the corners of her hull near the ladder, which are used to set her swing anchors ahead. Ordinarily she can set ahead about 40 feet before moving her swing anchors ahead.

In the control house are the various levers, push buttons, and other controls operated by the leverman. Recording ammeters to show the load on cutter and hoist motors are in front of the leverman, as are vacuum and pipe-line pressure gages.



C. & E. M. Photo

About 1,500 feet of floating pipe line were available for the Vicksburg's highway-embankment job. Steel cylinders strengthened by timber strongbacks floated the 50-foot sections. At right is a derrick barge.

The dredge has five fuel storage tanks aboard; the largest holds 2,600 gallons and the smallest holds 1,750 gallons. Two 600-gallon fresh-water tanks also store water. The dredge advances itself by means of two square steel spuds 50 feet long, each weighing about 12 tons. In digging position, only the starboard spud is down in the mud. These spuds hang off the stern gantry frames, and pass down through spud wells outside her steel hull.

There were about 1,500 feet of floating pipe line available on this job. The floating sections come in 50-foot pieces, fitted at each end with Mobile Pulley joints. Two steel cylinders 5 feet in diameter x 22 feet long float these pipeline sections. The outsides of the cylinders are strengthened by 12 x 12-inch timber strongbacks, and the floating lines are anchored at a few places, principally at the elbows, to give them stability.

Of the 8,000 feet of land line available, most of it was in 16-foot lengths, with standard slip joints. McWilliams used a Caterpillar D4 tractor with a bulldozer blade to roll pipe on the dump, but plenty of pipe was also rolled by the 15-man dump gang. When the land-line joints developed leaks, men plugged them with wood shingles.

Shortly before the job was visited, the bulldozer broke down one dark night when a line had to be changed.

(*Concluded on next page*)

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Dredge Vicksburg Builds Highway Fill

(*Continued from preceding page*)

The crew rolled 1,000 feet of pipe line back in 5 hours.

One of the key pieces of equipment on the job was a steel booster barge, where the material was raised from 40 to 85 pounds of line pressure and boosted out towards the fill. On this booster barge was a 1,400-hp Fairbanks-Morse diesel engine, with a 20-inch pump exactly like the one aboard the dredge. A small 100-hp diesel-driven generator served as a light plant.

The booster barge was located next to the shore, near the quarterboat and work barge. Lights from its plant served the adjacent pieces of equipment, such as the quarterboat.

The job also had a junk barge, a 40-ton derrick barge, an 1,800-barrel oil barge, a 200,000-gallon fresh-water barge, and an auxiliary barge on which were mounted two 2,000-gallon gasoline tanks and a 1,000-gallon kerosene tank. Boat facilities around the job included the 100-hp tug Queen, and the 60-hp service launch Red Wing. Excellent meals were served to about 80 men aboard the quarterboat.

The dredge consistently averaged 450 cubic yards per pumping hour, often getting 9,000 cubic yards in a day. While her work was on a basis of 24 hours a day, certain unavoidable delays reduced the effective pumping time to something close to 19 hours per day.

Dredging in connection with highway work is new in Texas and quite interesting to most of the men with the Texas Highway Department who were stationed on the job. One of them, used to high-density work with tractor equipment, remarked, "Well here at least we don't have to worry about not having enough water in the fill!"

Personnel

The job was designed and administered under the general supervision of D. C. Greer, State Highway Engineer, with Jed N. Robinson as Construction Engineer and R. E. Killmer, District Engineer at Beaumont. D. W. Syphrett was the Resident Engineer on the job, with H. T. Smith as his assistant.

For McWilliams Dredging Co., M. R. Fridge was the General Superintendent on the project, with Captain J. W. Eagleson in charge of the Vicksburg. Curtis Breaux was the Chief Engineer aboard the dredge and booster barge.

Completion of the job eliminates one of the toughest parts of construction on the new interstate highway, and will speed construction plans for the rest of the Houston-Port Arthur interstate highway.

Aero-Coupling Expansion

The Aero-Coupling Corp. of Burbank, Calif., is now operating under a license issued by the Aeroquip Corp. of Jackson, Mich. The expanded Aero-Coupling line consists of hose fittings and flexible hose lines for aircraft, hydraulic, and power-plant installation.

C. & E. M. Photo

The discharge line of the Vicksburg deposits fill for the Interstate Route 73 link. In the background are the clay levees thrown up to enclose the fill.

New Breaker Plows Fit All Truck Types

Two new breaker-type snow plows were introduced at the Road Show by the Root Spring Scraper Co., 547 W. North St., Kalamazoo, Mich. They are designed to break or push through even severe snows, and are shaped to handle either wet or dry snow. According to the manufacturer, these plows can be used on any type of truck, including the 4-wheel-drive type, as the close coupling allows the truck to fit well into the plow.

The Model 61V has a height of 54 inches at the nose and 71 inches at the rear. The moldboard is 12 feet 6 inches long and has a spread at the top of 10 feet 5 inches. The V has a 90-degree angle. There are three 8 x 19-inch shoes, and the cut at the bottom is 8 feet 6 inches. Approximate weight of the plow is 2,350 pounds; of the front hitch, 700 pounds.

The Model 71V has a height of 58 inches at the nose and 79 inches at the rear. The moldboard is 13 feet 2 inches long and has a spread at the top of 11 feet 4 inches. The V has a 90-degree angle. There are three 8 x 19-inch shoes, and the cut at the bottom is rated at 9 feet. Approximate weight of the plow is 2,540 pounds; of the front hitch, 700 pounds.

Further information may be secured from the company, or by using the enclosed Request Card. Circle No. 46.

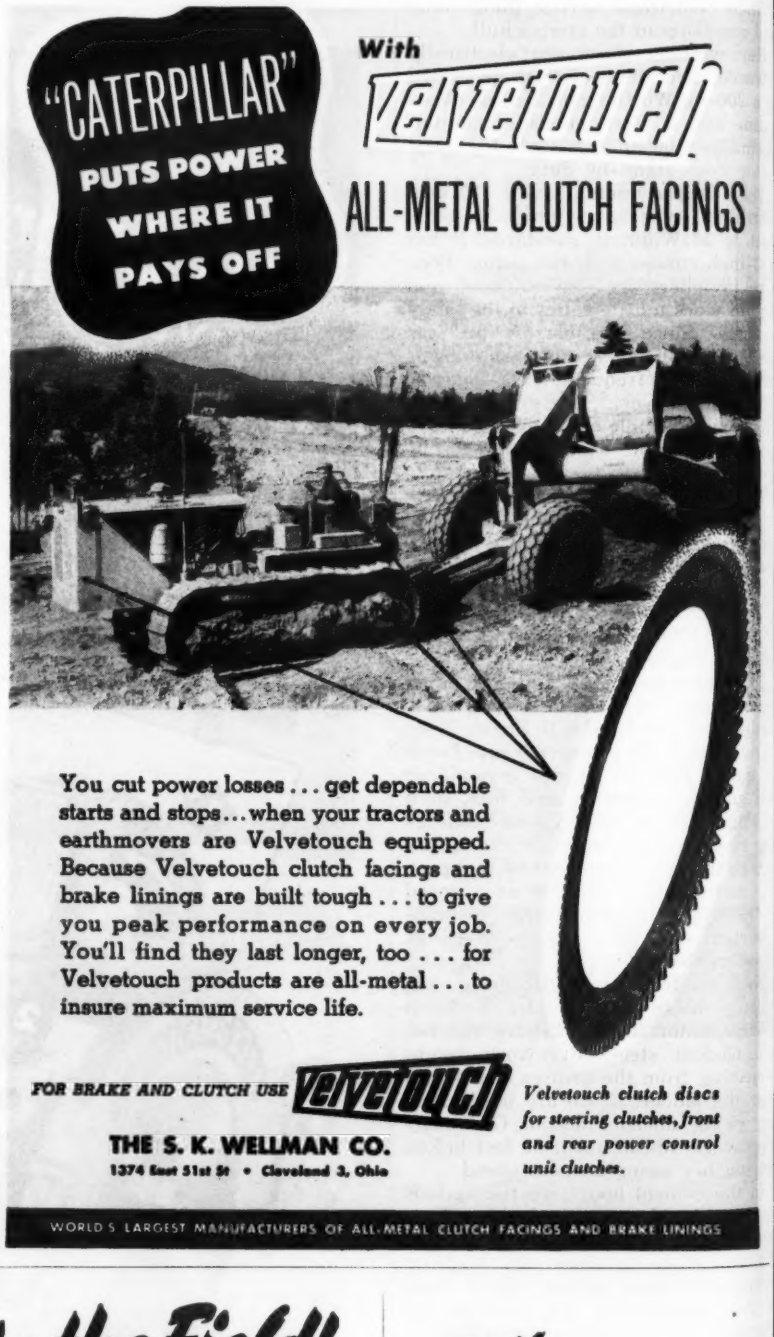
Step-by-Step Procedures For Asphalt Construction

Two bulletins on the use of Texaco asphalt for road building have been prepared by The Texas Co., 135 E. 42nd St., New York 17, N. Y. One discusses the building of road surfaces by the pressure-distributor method, and the other discusses plant-mix asphalt paving.

The pressure-distributor-method booklet discusses the step-by-step procedure to be followed in constructing standard and modified asphalt macadam; dense-graded and macadam-aggregate-type road-mix construction; and five kinds of asphalt surface treatments. The booklet also lists specifications for suitable aggregates, where required; the type of asphalt to be used; and other pertinent data. It tabulates the amount of Texaco asphaltic material required per mile of road for various widths and rates of application; tons of mineral aggregate required at various rates of application; weight and volume relations of mineral aggregates; gravity A. P. I., specific gravity, and pounds per gallon; temperature of saturated steam at various gage pressures; and linear feet of road covered with Texaco asphaltic materials at different rates of application, with tanks of various capacities. The booklet also contains instructions for unloading asphalt from steam-coil tank cars. The final page gives a representative listing of Texaco asphaltic products and their uses.

The booklet on plant-mix asphaltic paving describes the use of sheet and sand asphalt; hot-mix asphaltic concrete, either hot or cold-laid; and cold-laid asphaltic concrete, using either asphalt surfacing materials or emulsified asphalt as binder. This booklet also describes each process step by step, showing numerous pictures of roads which have been paved by each method.

Copies of this literature may be obtained from the company, or use the enclosed Request Card. Circle No. 85.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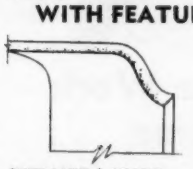

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An electrically driven masonry saw for cutting cinder blocks, precast concrete shapes, tile, and similar construction material, is manufactured by the Victor Engineering Corp., 53rd and Whitby Ave., Philadelphia 43, Pa. The Victor Feedmatic saw is designed for wet operation and can be used with diamond or abrasive blades. It can be operated by a foot pedal or with the head in a fixed position for a constant depth of cut.

A feature claimed for this saw is the Feedmatic blade-pressure control. It consists of an adjustable weight, which slides on the belt guard. Once it is set at the proper position, it is designed to provide automatically the correct blade pressure for the material being cut, and to control the pressure as the blade feeds through the material.

Circulation in the self-contained coolant system is provided by a positive-displacement rotary pump. Stainless-steel water jets are built into the blade guard and deliver water to both sides of the blade. Height adjustment is obtained by a lever-operated toggle mechanism. The headlock for diamond-blade cutting is controlled by the operator from his normal cutting position.

Further information may be secured from the company, or by using the enclosed Request Card. Circle No. 92.

Heavy-Duty Truck Has 8-Ton Capacity

An 8-ton 4-wheel-drive truck was shown at the Road Show by Oshkosh Motor Truck, Inc., Oshkosh, Wis. The Model W-703, powered by a Hercules RXLD gasoline engine, has a 150-inch wheelbase, 4-wheel brakes, and a gross vehicle weight of 30,000 pounds.

Standard equipment includes a Zenith downdraft carburetor, Pierce mechanical governor, 5-speed Fuller transmission with two-speed auxiliary, providing a total of 10 speeds forward and 4 reverse, Budd disk wheels, force-feed lubrication, oil-bath-type air cleaner, single-plate clutch, Spicer needle-bearing-type universal joint, Ross steering gear, and a 72-inch-wide cab.

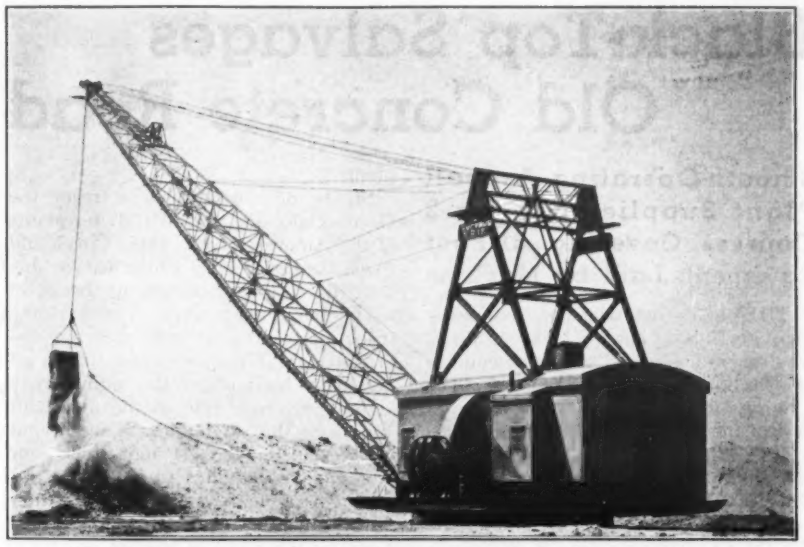
Further information may be secured from the company, or by using the enclosed Request Card. Circle No. 88.

Walking Dragline Has High Volume Rate

A new walking dragline for use where a large volume and steady flow of material is needed is announced by the Bucyrus-Erie Co., S. Milwaukee, Wis. The 450-W features stability combined with maneuverability, high capacity and wide working range, balanced power, accurate control, and simplicity of design combined with strength.

The 450-W swings 8 to 10-cubic-yard buckets from 200 to 165-foot-long booms. With an 8-yard bucket and 200-foot boom, it can move material 407 feet without throwing the bucket, the manufacturer states. Weights and loads are designed so that the center of gravity shifts through a limited range, improving the balance of the machine and its stability. The B-E rolling-cam walking action permits walking the machine in any direction to the most effective digging position. The large area of the base and shoes, coupled with proper weight distribution, makes possible walking and working on soft ground and in all kinds of weather, the company points out.

Hoisting and lowering are controlled through air-operated clutches and brakes. Swing machinery is actuated by a Ward-Leonard variable-voltage control. Design of the frame and body is said to hold the machinery rigid and in accurate alignment. The booms have a T-section chord member and tubular bracing to give maximum strength with minimum dead weight.

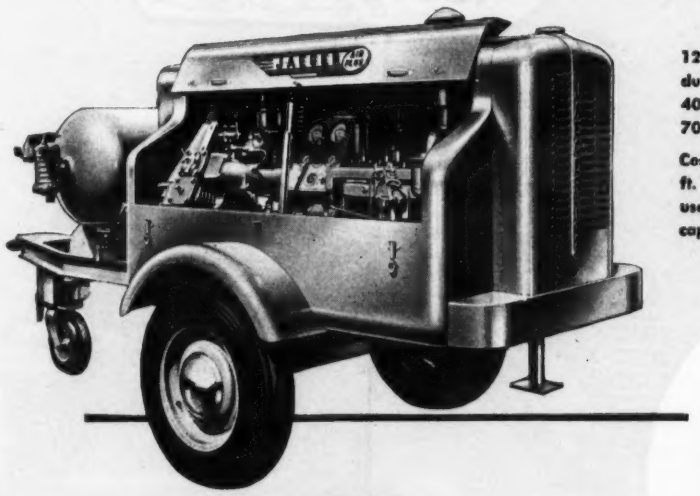


Here is the new Bucyrus-Erie 450-W walking dragline in action.

Further information may be secured from the company, or by using the enclosed Request Card. Circle No. 93.

"New Standard" 125 FT. Compressor does

40% more work yet sells at old 105 Ft. price



125 cfm of air runs 2 big breakers or 3 medium duty breakers at full 90 lbs. pressure — doing 40% more work than you can do with weak 70 lbs. pressure from 105 ft. of air.

Costs no more than old "single breaker" 105 ft. compressors, weighs no more, and does not use an ounce more fuel when its additional air capacity is not required.

Model 75 cfm — runs a heavy breaker, 2 light breakers or 3 tampers at 90 lbs. pressure — which a model 60 can't do.

Model 185 cfm — runs 3 heavy breakers or medium rock drills at 90 lbs. pressure — which a model 160 can't do.

Model 250 cfm — runs 4 heavy breakers, 2 heavy drills or medium wagon drill at 90 lbs. pressure — which a model 210 can't do.

Model 365 cfm — runs a heavy wagon drill plus rock drill or heavy breaker at 90 lbs. pressure — which a model 315 can't do.

Model 600 cfm — runs 2 heavy wagon drills plus heavy rock drill at 90 lbs. pressure — which a model 500 can't do.

All "New Standard" Air-Plus Compressors deliver more air to run more tools at full 90 lbs. pressure, yet cost no more than obsolete "old standard" sizes!

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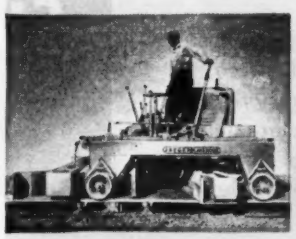
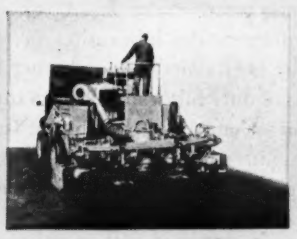


Diagonal Screed Finishers and Remixing-Compacting Screw Spreaders — team with today's mass-production pavers.



Model BP-5 Bituminous Payer instant 8-12½ ft. adjustability, fast oscillating compactor and screeds, many other features.

Truck Pavers with Concrete Spreader — the mobile paving plant for half-width slab without detours, other concrete pours.

HYDRO-HOISTS with 2 Speeds, Hydraulic Control

SURE PRIME Dewatering and Pressure Pumps

SPEEDLINE Concrete, Plaster, Bituminous Mixers

Black-Top Salvages Old Concrete Road

Smooth-Operating Asphalt Plant Supplies Mix for 2 Courses Covering 31-Foot Pavement; Laid by Machine

✦ THE old 31-foot-wide concrete pavement on U. S. 12 east of Jackson, Mich., was recently repaved with two courses of plant-mix asphaltic concrete. The 5.1-mile improvement began 8 miles east of the city line, and continued east to the Washtenaw County line. The Michigan State Highway Department, Charles M. Ziegler, Commissioner, awarded a contract for the job to the Wright Construction Co. of Williamston, Mich., on its low bid of $99,896.40. Work got under way the latter part of July, 1947, and was finished in October.

Because the contractor had another plant-mix job located north of Jackson on his schedule, he decided to set up his asphalt plant on the outskirts of the city so that it would be central to both jobs. This meant a longer haul, an average of 12½ miles to the U. S. 12 job. But it also meant that he could use the same plant location for both jobs, and thus eliminate costly dismantling and erection charges. The average haul to the job north of the city was 9 miles.

While the 5.1-mile stretch of concrete on U. S. 12 was cracking and uneven in places, it was caught in time to permit the black-top resurfacing to do a smooth salvage job. Only in three places did concrete patching have to be done. Then the old pavement was ripped out the full width of a 10-foot slab for distances varying between 60 and 120 feet, and replaced with concrete. The plant-mix was laid on top of the patching as it was on the rest of the pavement. About 150 tons of material was used as a leveling course in some particularly bad locations, but for the most part the two courses, bottom and top, sufficed to produce an even riding surface.

When compacted, each of the two machine-laid courses measured a trifle over an inch in thickness. The usual amount of material required was 220 pounds to the square yard. The black-top, which was mixed in a pugmill-type plant, consisted of stone, sand, limestone dust for a mineral filler, and asphalt.

Plant Set-Up

The contractor set up his modern Hetherington & Berner 2-ton pugmill asphalt plant on a 12-acre plot of ground located in the south end of Jackson. The site was rented from the New York Central Railroad whose main-line tracks adjoined the flat field. Two siding tracks, about which the plant was erected, served as instruments of material supply. Coarse sand for the mix was also taken from a pit at one end of the property. This was blended with a finer sand during the passage of the aggregate through the plant, thereby meeting the gradation requirements for the mix.

The coarse sand was dug out by a Lorain 41 ¾-yard dragline. It was loaded into trucks hired by the hour, and hauled to the plant site and stockpiled. The other grade of sand, which was finer, was supplied locally by the Jackson Gravel Co. The two grades of sand were stockpiled side by side next to a Pioneer 15-yard 2-compartment hopper bin. A Lorain 41 crane with a 40-foot boom and Wellman ¾-yard dragline bucket blended the two grades of sand when it charged the sand compartment of the hopper bin from the two stockpiles. The same crane was used to load coarse sand to the feed plant.

Stone for the mix came from the Green Oaks and Oxford, Mich., plants of the American Aggregates Corp., and the Lincoln Crushed Stone Co. at Joliet, Ill. It was delivered to the plant in hopper-bottom cars over a siding track that ran past the receiving aggregate bin. For quick unloading, a pit had been built under the siding track on the opposite side of the aggregate bin from the sand piles. The pit had concrete side walls 1 foot thick, and was wedge-shaped with a 3-foot width at the rear and an 8½-foot width in front. In this way the stone spread out towards the front of the pit so that it was easily picked up by the crane and loaded into the bin.

(*Continued on next page*)

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How far between your engine overhauls?

Engine overhauls are few and far between for the Consumer Sales Agency fleet, Moline, Illinois. Its International K-11 trucks travel from 100,000 to 130,000 miles before any mechanical service work, requiring removal of engine heads or dropping of pans, is needed.

Operators of this fleet credit the plus qualities of Stanolube HD Motor Oil for the fine performance of their heavy-duty trucks. They report that engine parts have lasted longer because they have been kept clean and protected against wear.

Stanolube HD delivers the lubrication performance that will keep your fleet units rolling longer between overhauls. This heavy-duty lubricant owes its superiority to the combination of effective oxidation-resistant and detergent additives with solvent-extracted base stocks of the highest quality. Extra protection that cannot be obtained from straight mineral oils is thus afforded by Stanolube HD.

Consider the experience of the Consumer Sales Agency fleet with Stanolube HD. Why not let the unusual performance of these trucks point the way to lower maintenance costs for your fleet? Standard Oil Company (Indiana), 910 South Michigan Avenue, Chicago 80, Ill.

Stanolube HD Motor Oil

STANDARD OIL COMPANY (INDIANA) STANDARD

At the bottom of the hopper-bottom 2-compartment bin was a dual-gate feeder which moved the sand and stone along to a 30-inch x 50-foot conveyor belt. At the end of the belt the aggregate entered a 50-foot-long x 7-foot-diameter single-drum drier. Two Volcanic low-pressure burners, under vacuum draft control, were located at the other end of the drier. They were adjusted to heat the aggregate to a maximum of 425 degrees F.

Above the intake end of the drier, a fan powered by a 25-hp motor drew off the fines into a dust collector, while the fumes and gases escaped through a smokestack. As the fines settled down they were moved along an enclosed chute to the bottom of the hot elevator where they joined the heated aggregate. The 35-foot-high enclosed hot elevator raised the material to a Deister double-deck 4 x 10-foot shaker screen which had ⅝-inch openings on top and 3/16-inch openings on the bottom. The oversized stone was chuted down to form a stockpile of its own.

Under the screens were two aggregate bins holding 15 tons each—one for the material passing the ⅝-inch screen and retained on the 3/16-inch, and the other for the aggregate that passed the 3/16-inch screen.

Other Plant-Mix Materials

Limestone dust, used as a mineral filler in the mix, was shipped to the plant in freight cars from the Waukesha Products Corp. of Waukesha, Wis. These cars were routed to the siding track at the other end of the plant where a 50-ton silo was located. The bulk dust was unloaded from the cars with a 2-wheel cart which dumped the filler into a hopper. At the bottom of the hopper was a worm gear which moved the lime along to an enclosed 30-foot-high elevator and thence to the silo. The freight cars usually held from 45 to 70 tons of limestone dust.

This enclosed elevator on the silo also directed the dust to a screw conveyor which moved the material to a 900-pound storage bin in the central tower of the plant. From there it was dropped into the weigh bucket along with the sand and stone.

Asphalt for the mix had an 85-100 penetration, and was supplied by the Great Lakes Asphalt & Petroleum Co. of Chicago, Ill. It was shipped in tank cars to the same siding at the east side of the plant which was used for unloading the limestone cars. Near by was a Scotch marine 125-hp locomotive-type boiler which burned fuel oil stored in a 10,000-gallon tank on the other side of the track from the boiler. The fuel oil, which was also burned in the drier, was delivered to the plant in tank trucks from the Leonard Refineries at Alma, Mich.

The boiler heated the bitumen in the tank cars so that it could be pumped out either to the two 10,000-gallon storage tanks alongside the track, or directly to the pugmill. The asphalt made a complete circuit through a 3-inch steam-jacketed pipe line from the storage tanks to the plant and back again. A steam valve controlled the circulation of the hot fluid asphalt.

Just below the aggregate bins in the plant tower was the 2-ton weigh bucket equipped with Kron dial scales. There the sand, stone, and limedust filler were weighed out before they were dropped into the 2-ton pugmill below. In the mill these ingredients were mixed dry for 10 seconds before the asphalt, automatically controlled by a Fluidometer, was admitted. The wet batch was then mixed an additional 50 seconds before the steam-controlled discharge gates on the pugmill were opened and the batch dumped into the truck below.

Diesel-Electric Power

The portable 2-ton plant was operated by a Caterpillar D17000 diesel engine which in turn drove a General Electric 100-kw generator. The generator furnished electric power for the various makes and sizes of motors to run the sundry moving parts of the big plant. The feeder on the sand and stone bin, together with the cold-aggregate conveyor, operated from a 10-hp motor. Moving the drier through a Falk gear reducer required a 30-hp motor, the largest on the plant. A

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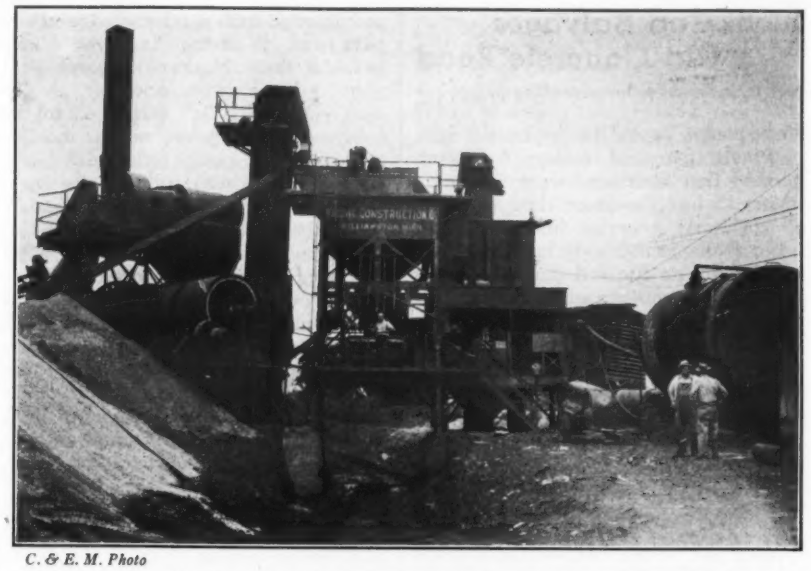

C. & E. M. Photo

Wright Construction Co. set up its Hetherington & Berner 2-ton pugmill asphalt plant on a 12-acre plot of ground in the south end of Jackson, Mich. This is a front view of the plant with stockpiles at the left and asphalt tanks at the right.

TRAILERS

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NOW—3 Sealcoat TANDEM ROLLERS

3 to 5
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7 to 10 **TON**
VARIABLE WEIGHT

SINGLE LEVER HYDRAULIC STEERING—
CONVENIENT
ELECTRIC STARTER—
and MANY OTHER
TOP MECHANICAL AND
CONVENIENT FEATURES

This pictures the left side of the new 5 to 8 ton SEALCOAT TANDEM ROLLER with the operator seated at the right of the "double width" operator's seat where he can roll to within 2" of a building or curb line. With the Dual Control on the clutch (as shown—extreme left and right) he can operate with the desired precision when seated on either side. This arrangement also applies to the 7 to 10 ton SEALCOAT Roller.

These three absolutely new SEALCOAT Tandem Rollers are designed in a size range that will handle 90% of your compaction jobs—asphalt, gravel or other rough surface jobs—and with remarkable ease and speed. One outstanding feature of all is the minimum (1½") frame extension on one side which allows finishing WITHIN 2 INCHES from buildings, fences or posts. With 13¾" ground clearance of the 3 to 5 ton roller and 16" for the two larger rollers, you can have hair-line finishing when working along curbs and other side obstructions. You eliminate costly hand finishing.

All sizes are properly powered: The smaller roller with a 25 H.P. Industrial Engine and the other two with Chrysler Industrial Engines with Fluid Coupling. The 3 to 5 ton Sealcoat roller has two forward and two reverse speeds with a range from .93 MPH to 4 MPH, while the two larger rollers have three forward and three reverse speeds from .93 MPH to 4.15 MPH.

The 3 to 5 ton SEALCOAT Tandem Roller will finish 38" wide with both the steering and compaction rollers. The 5 to 8 ton and 7 to 10 ton models have 50" width rollers.

Hydraulic Steering allows the operator to work fast and with a precise control that finishes the job quickly. It's less tiring than any other steering type. Regardless of size, these rollers possess a maneuverability that is important. They will work handily in small areas and confined spaces.

AN OUTSTANDING NEW FEATURE of the two larger sizes is the SEALED, OIL-TIGHT CASES in which run the special alloy steel drive gears. This method of gear enclosure assures positive lubrication and completely excludes all otherwise damaging abrasive matter.

OTHER IMPORTANT FEATURES ARE: Foot Operated Parking and Service Brake. Geared Bull Wheel for positive power transmission and faster starts and stops. Low center of gravity for working safely on other than flat surfaces. Free access to all working parts. Frame of steel-rigid boxtype construction with heavy-duty cross members. Electrically welded throughout. Twin Disc Clutch. Timken Roller Bearings on all rotating shafts and Alemite pressure lubrication.

Sealcoat TANDEM ROLLER

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Black-Top Salvages Old Concrete Road

(*Continued from preceding page*)

25-hp motor drove the fan on the dust collector. Sizes of motors for some of the other functions were: hot elevator, 15 hp; limestone-dust elevator, 10 hp; worm gear for limestone dust, 5 hp; shaker screens, 10 hp. The electrically driven fuel-oil pump required only a 1-hp motor, while the asphalt pump employed a 15-hp motor.

Maintenance repairs around the plant were made with a Hobart 300-amp electric welder. Streams of compressed air were used to keep the working parts of the plant clean from the ever-present dust. A Chicago Pneumatic 110-cfm portable compressor supplied the air.

The Mix

Since the trucks hauling the batches were limited to highway loads of 7 tons each, the contractor decided to produce batches weighing 1¾ tons or 3,500 pounds each, instead of the 2-ton batches which the pugmill could accommodate. This simplified the weighing, as each truck was loaded with 4 batches which had a total weight of 14,000 pounds or 7 tons.

Typical batch weights for the base and surface courses were as follows:

Material	Surface Course
Stone	1,950 lbs.
Limestone dust	125 lbs.
Sand	1,195 lbs.
Asphalt, 22½ gallons	230 lbs.
Total	3,500 lbs.

The gradation of the stone, blended sand, and limestone-dust filler used in the mix were as follows:

Sieve Size	Per Cent Passing		
	Stone	Blended Sand	Limestone Dust
⅝-inch	100	....	....
½-inch	90-100	....	....
No. 4	0-25	100	....
No. 10	0-10	95-100	....
No. 40	....	65-95	100
No. 80	....	40-60	....
No. 200	....	0-5	75

The electrically controlled push-button plant averaged 550 tons of hot-mix in a 9-hour day. By working one hour overtime on one occasion, it turned out a high production of 780 tons in a 10-hour day.

An average of 12 trucks, hired on the ton-mile basis, were engaged to haul the batches the 12½-mile average distance from the plant to the job. The trucks made a complete loop through the plant, running under the batch tower without having to back up or turn around. The mix was usually around 350 degrees F when it was dumped in the trucks, and was immediately covered with tarpaulins. On the way out of the plant yard the trucks and contents were weighed on a Winslow beam scale.

On the Road

Before the base course of plant-mix was laid on the 11-year-old concrete pavement, the surface was first given a bond coat of AE-2 asphalt emulsion. This was applied at the rate of 0.15 gallon to the square yard by an Etnyre 2,500-gallon distributor mounted on a White truck. The asphalt was supplied by the American Bitumuls Co. of St. Louis, Mo., and stored in a 5,000-gallon vertical tank at the plant. The distributor and storage tank together held the contents of the tank car in which it was shipped.

This bond coat was usually run out for about 1,000 feet ahead of the laying of the base course. The plant-mix was laid across the 31-foot pavement in two 10-foot and one 11-foot lanes by an Adnun Black Top Paver. After a day's work on one lane, the paver was shifted to the adjoining lane the next day, and then to the third lane on the following day. On the top course, the job progressed from the east to the west end.

When working on the outside lanes, a row of spikes was driven in the shoulders, 8 inches off the edge of the pavement. A string line was drawn between these markers to serve as a guide for the paver operator. A ¼-inch pipe "tell-tale" was fixed to the front end of the paver so that the line could be more easily followed.

Each course was rolled twice by a Buffalo-Springfield 8 to 10-ton tandem roller, the first pass as a breakdown and the second pass for back rolling. After this compaction, each course measured a trifle over an inch in thickness. The base course was completed on the job throughout before the surface course was laid. During the paving operations on one lane, traffic was maintained and directed on the other two lanes by a couple of flagmen. Within half an hour after the final rolling, cars were permitted on the new surface.

The rakes and shovels used by the asphalt workers were cleaned in a can of kerosene carried along on the paver. The paver hopper and the rolls were cleaned with soluble oil. A White truck pulling a farm wagon accompanied the paving crew to carry the necessary drums of water, oil, gasoline, and kerosene.

At the two extremities of the job, a smooth-riding joint was desirable so that cars would not receive a bump in going from the concrete to the 2-inch-higher black-top surface. Accordingly, a strip of concrete 3 feet long and 1½ inches deep, was gouged out at each end for the full width of the pavement along an expansion joint. The transition from the concrete pavement to the 2-inch-higher black-top began at this point and continued for 25 feet as a gradual wedge was made with the

(*Concluded on next page*)

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CUMMER ASPHALT PLANTS

COMPLETE PLANTS FROM 60 TO 100 TONS PER HOUR FURNISHED AS ILLUSTRATED

Other Smaller Plants Portable Mounted on Pneumatics

PROMPT SHIPMENT ON ALL SIZES FEEDERS—STORAGE BINS—PUMPS—TIMERS AND OTHER UNITS AS REQUIRED

Literature Upon Request

CUMMER TWO-FIRE DRYER and 40-TON BIN UNIT

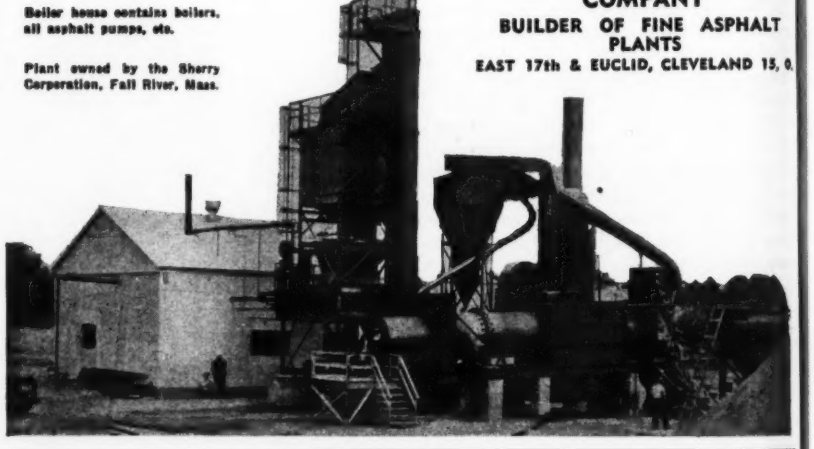
PHOTO BELOW SHOWS TYPICAL INSTALLATION

60 tons per hour capacity—located at Fall River, Mass.

Completely equipped with dust collection unit discharging into boot of hot elevator. Plant is equipped with 3-compartment cold storage hopper and feeder for regulation of feed into the dryer. 4' x 10' vibrating screen, 40-ton bin, 1-ton mixer, dial scales complete with all motors and drives.

Boiler house contains boilers, oil asphalt pumps, etc.

Plant owned by the Sherry Corporation, Fall River, Mass.



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BURCH "Tilt-lev" with an Auxiliary Blade

• Especially adapted for shoulder work on hard surface roads. Smaller blade (also hydraulic-controlled from cab) brings in sufficient material to help fill in low places. Larger blade clears material from hard surface.

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BURCH "Snow-Flo" Plows

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SINCE 1875 CRESTLINE, OHIO

C. & E. M. Photo
Plant Inspector Max Kaiser, left, and the contractor's Plant Superintendent, T. J. "Dutch" Holtz, agreed to pose for one quick picture.

plant-mix. The shallow trench cut in the concrete and filled with the mix prevented raveling at the point of the wedge, as would have happened if the tapering had simply been feathered off at the end.

The high production for any one 5-day week was 34,946 feet of single-lane pavement for a single course of plant-mix. During that week the paving crew worked 10-hour days.

Quantities and Personnel

Only the two following items were included in the 5.1-mile contract:

Bituminous bond coat, AE-2 asphalt emulsion	13,934 gals.
Bituminous concrete	10,330 tons

The Wright Construction Co. employed an average force of 33 men under the direction of Robert McCook, General Superintendent. T. J. "Dutch" Holtz was Plant Superintendent, and Duane "Dutch" Rowse was Paving Superintendent.

At the beginning of the job Frank "Barney" Engle was Project Engineer for the Michigan State Highway Department. One day while looking over the job, he was cut down by a passing motorist and left with a broken leg which hospitalized him. Lloyd Leonard carried on for Engle. Max Kaiser was Inspector at the asphalt plant, and Ottis Cornett inspected the laying operations.

The Highway Department is headed by Charles M. Ziegler, Commissioner, with H. C. Coons, Chief Engineer. Scott A. Baker is Acting Construction Engineer.

Truck Power Take-Off

A packaged heavy-duty power take-off is announced by the Truck Equipment Division of the Davey Compressor Co., Kent, Ohio. The Davey P-80 is designed to fit all standard trucks and to transmit full engine power for the driving of heavy-duty truck-mounted equipment. It contains 12 fewer parts than the Davey Model 75 unit, and is 25 pounds lighter. The take-off unit itself is identical for all trucks; the mounting parts are engineered for individual truck makes. The P-80 is 16¼ inches long and weighs 125 pounds.

Further information may be secured from the company, or by using the enclosed Request Card. Circle No. 103.

Republic Steel Promotions

Peter Robertson has been appointed Assistant to the District Manager of Republic Steel Corp.'s Cleveland district. The position he formerly held—that of Works Manager of the Truscon Steel Co. in Youngstown—has been taken over by Douglas K. Forsyth. And Mr. Forsyth's former position of Assistant Works Manager has been filled by John H. Hamill who was Superintendent of Truscon's Structural Steel Department.

Safe-Travel Odds On Parkway 6 to 1

Users of the Merritt and Wilbur Cross Parkways have better than a 6 to 1 chance of avoiding a fatal accident as compared with users of U. S. 1, the Boston Post Road. This fact is indicated in a recent report of the Connecticut Traffic Engineering Section, Division of Highway Control, in "Cuts and Fills", a publication of the Connecticut State Highway Department. The report covers the accident experience on the two roads for the period from 1942 to 1946, inclusive.

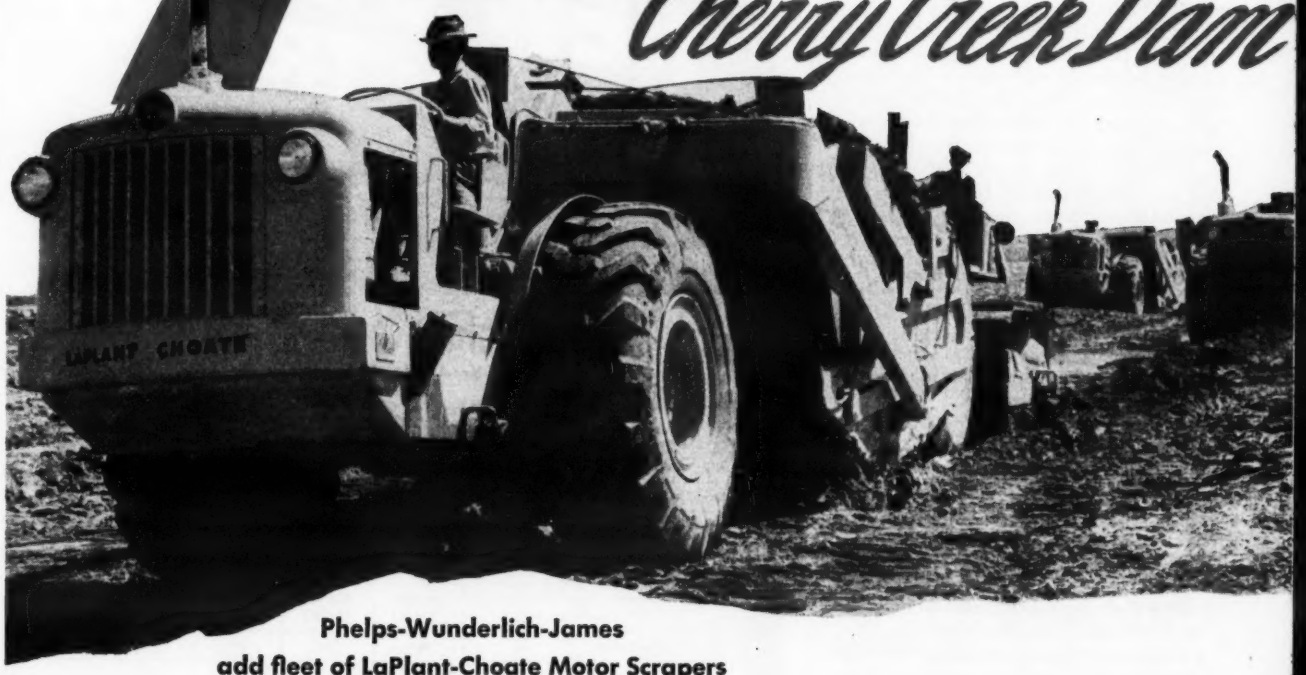
For the purposes of comparison, studies were confined to the parkway from the New York state line to Connecticut Route 34 in Orange; and to the Post Road from the New York state line to the New Haven town line. The parkway section measures 43 miles, and the Post Road section measures 42.7.

Fatal accidents on the parkway section for the 5-year period numbered 14; while the count on the Post Road was 88 for the same period. Total accidents on the parkway numbered 1,079; on the Post Road, 3,392. This gives a rate of one fatality for every 77 parkway accidents, against one for every 38 on U. S. 1. The death rate on the parkway test section was 2.46 per 100,000,000 vehicle miles; on the Post Road it was 12.5. In comparison, the rate for Connecticut state-maintained highways averaged 4.3 in 1947, while the national provisional figure is 8.6 for the same year.

In a breakdown of accidents by types, the report indicates that on each road the greatest number occurred with vehicles traveling in the same direction. Likewise, the greatest number of accidents occurred in the daytime. This was also true of the fatal accidents on the parkway. However, there were over four times as many fatal nighttime accidents on the Post Road as fatal daytime accidents.

This report bears witness to the great reduction in travel hazards on a highway carrying classified separated traffic, as opposed to a 4-lane route carrying mixed traffic in unseparated lanes and through urban areas where the cross flow on the same level is a constant factor.

LaPLANT-CHOATE
MOTOR SCRAPERS
speed huge earthmoving job
at Colorado's *Cherry Creek Dam*



Phelps-Wunderlich-James add fleet of LaPlant-Choate Motor Scrapers for 16,000,000 cu. yd. earthmoving job.

Big jobs need big units to finish them on time—at a good profit. That's why Phelps-Wunderlich-James picked big LaPlant-Choate Motor Scrapers to move the millions of yards of fill needed for the Cherry Creek Dam. These modern earthmoving units are big all over: Big Scraper Capacity—18 heaped cu. yds. per trip; Big Power—225 h.p. Buda diesel engine that provides 16 h.p. per cu. yd. of scraper capacity; Big Tires—21:00 x 29 Earthmovers, interchangeable front and rear; Big Brakes—4-wheel air brakes for maximum safety; and Big Production because every feature is designed for operator's comfort and ease of operation to minimize operator fatigue.

Add to these—fast loading in all kinds of material high speed travel to and from the fills—power to mainta high speed on grades and soft places—and you have t reasons why LPC Motor Scrapers are making such reco at Cherry Creek Dam and on countless other earthmovi jobs throughout the world.

Whether your job is moving millions of yards or a f thousand, you'll make more profit with LPC Mo Scrapers. Ask your nearest LPC distributor for details a new low price of motor scrapers. LaPlant-Choate Ma facturing Co., Inc., Cedar Rapids, Iowa; 1022 77th Av Oakland, Calif.

LaPLANT-CHOATE

HIGH SPEED EARTHMOVING EQUIPMENT

Big Shop Services Equipment on Dam

Contractors Buy Hangar And Install Complete Equipment to Service And Rebuild Machines

✦ WHEN the equipment-repair superintendent at Bull Shoals Dam in Arkansas (see C. & E. M., Aug., 1948, page 2) was asked how the Bull Shoals shop and service facilities compared to other dam jobs in his experience, he said, "This is the finest, best laid out shop I've ever seen on any dam!"

That statement sums up the machine shop and the program of equipment upkeep at Bull Shoals Dam, being built near Cotter, Ark., for the Little Rock District Office of the Corps of Engineers. There Ozark Dam Constructors set up a complete shop and a maintenance system on equipment to meet a serious problem.

Initially there was urgent need for a good, roomy shop because much of the heavy equipment imported for use on the dam had already been through one, two, or more dam jobs before Bull Shoals. Some items needed extensive repairs, and some pieces had to be rebuilt from scratch. The shop was one of the first parts of the job to be needed badly.

To meet this need, Ozark Dam Constructors purchased an airplane-repair hangar made of corrugated iron with structural-steel side and roof members. This big hangar measured 246 x 131 feet. It was set up below the dam site on the right bank of the White River, and an addition 30 x 180 feet in size was built to make the administrative headquarters for the job.

Hangar Divided Into Shops

The big hangar was equipped with a concrete floor throughout, with graveled yards and access areas. It was then divided into the following main sections: a main repair floor with two grease pits in a 32 x 35-foot area, the main floor being 45 x 106 feet; a 30 x 36-foot blacksmith shop; a 24 x 30-foot steam-cleaner room and wash rack; a 45 x 60-foot welding shop; a 16 x 24-foot tire-storage and repair room; a 12 x 24-foot battery-charging room; a 17 x 24-foot automotive-parts room; a 20 x 17-foot pipe and pump shop; and a 48 x 105-foot warehouse.

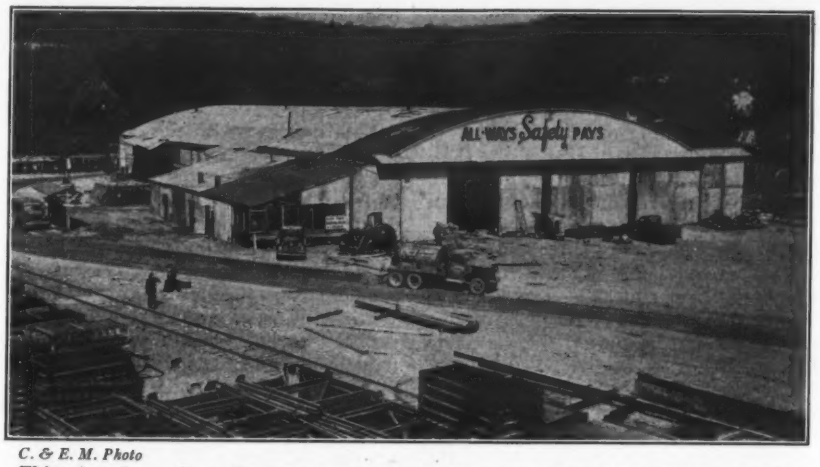
Late-model repair equipment—most of which was second-hand—was then purchased and installed in the shops to staff them for any job. Some of the main equipment included the following items:

Main Repair Shop:

1 Cincinnati-Bickford 6-foot radial heavy-duty drill press
1 Cincinnati-Bickford 3-foot radial drill press
1 Lodge & Shipley 28-inch lathe, 18-foot bed
1 Lodge & Shipley 16-inch lathe, 16-foot bed
1 Beaver threading machine
2 Johnson power saws
1 Wells power saw
1 Cincinnati No. 4 milling machine
1 Gould & Eberhardt shaper
1 Dake 75-ton hydraulic press
5 shop-made stand cranes with hoists for heavy repairs
3 Weaver hydraulic jacks

Welding Shop:

1 Oxweld circle burner
1 bending block
2 National burners for straight or circle cutting
1 Johnson power saw
4 Lincoln arc-welding machines
1 Baldor heavy-duty grinder



C. & E. M. Photo

This view from above the Ozark Dam Constructors yard shows the airplane hangar which was set up as an equipment-repair shop at Bull Shoals Dam. The administrative headquarters are out of sight behind the shop.

Magneto and Motor-Repair Room:

1 Black & Decker 6-inch heavy-duty grinder
1 Delta post drill
1 Sioux valve-face grinding machine
1 vise and 2 tables

Miscellaneous Equipment:

2 Torchweld stationary automatic acetylene generators
1 Littleford Tankar steam heater, with
1 Vapor-Clarkson steam generator
1 complete set of Lincoln high-pressure grease guns

Each shop and station in the big hangar has its own oxygen and acetylene outlets. The acetylene gas is generated by the two Torchweld units from carbide and water, and is distributed usually at 15-pound pressure through lines which reach all parts of the building. Oxygen comes to the job in standard metal bottles, and is distributed through the hangar by a pipe system. Five oxygen bottles can be used at one time.

The five shop-made hoists are important features of the machine shop. Two of these machines are extremely heavy-duty, and can pick up a Caterpillar D8 tractor to make repairs. They have Ingersoll-Rand 10-ton air hoists, two to each unit, for lifting power. The others use lighter forms of power, chain hoists, and the like.

(*Concluded on next page*)

Compare NEW DODGE "Job-Rated" TRUCKS feature for feature!

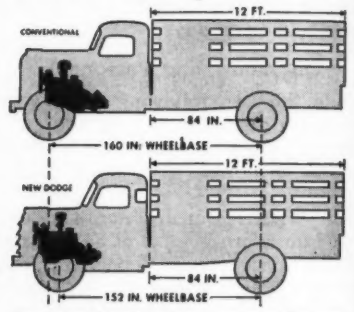
Read this 10 Point Comparison

(Dodge Model F-152; 14,500 pounds Gross Vehicle Weight—and Comparable Competitive Models.)

FEATURES AND ADVANTAGES	DODGE "Job-Rated" TRUCK	TRUCK "A"	TRUCK "B"	TRUCK "C"	TRUCK "D"
Wheelbase	152 in.	161 in.	158 in.	159 in.	161 in.
Cab-to-Axle—to take 12-foot body	84 in.	84 in.	84.06 in.	84 in.	84 in.
Wide-Tread Front Axles (shorter turning—more stability)	62 in.	56 in.	60.03 in.	58⅜ in.	56 in.
Modern "Cross-Type" Steering	Yes	No	No	No	No
Turning Diameter * —Left	50½ ft.	61½ ft.	60½ ft.	54½ ft.	66½ ft.
—Right	50½ ft.	61½ ft.	54½ ft.	54½ ft.	66½ ft.
Maximum Horsepower	109	93	100	93	100
Total Spring Length (Front and Rear "Cushioned Ride") †	194 in.	171⅛ in.	182 in.	176 in.	182 in.
Cab Seat Width (Measure of Roominess) ‡	57¼ in.	52¼ in.	51½ in.	47½ in.	52¼ in.
Windshield Glass Area ▲	901 sq. in.	713 sq. in.	638 sq. in.	545 sq. in.	713 sq. in.
Vent Wings plus Rear Quarter Windows	Yes	No	No	No	No

* To outside of tire (curb clearance.) Computed from data based on tests or computations obtained from usually reliable sources. † All four springs. ‡ Measured from production models. ▲ Computed from width and depth measurements; no allowance for contours.

Better Weight Distribution
Easier Handling
Shorter Turning Diameters

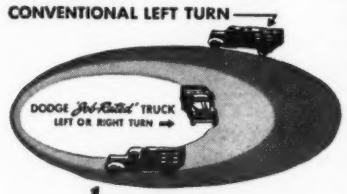


Front axles have been moved back, engines forward, placing more load on the front axle. While cab-to-axle dimensions are the same, wheelbases are shorter, giving better weight distribution, and increased payload.

This new weight distribution, combined with longer springs, produces a marvelous new "cushioned-ride."

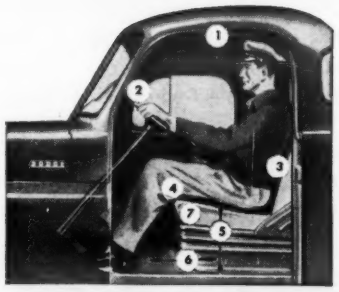
You get still more comfort from new "Air-O-Ride" seats, with their easily controllable "cushion of air."

CONVENTIONAL LEFT TURN



CONVENTIONAL RIGHT TURN

You can turn in much smaller circles, both right and left—you can back up to loading platforms or maneuver in crowded areas with greater ease—because of new type "cross-steering," shorter wheelbases, and wide tread front axles. In all, 248 different "*Job-Rated*" chassis and body models. Up to 23,000 lbs. G.V.W. Up to 40,000 lbs. G.T.W.



1—PLENTY OF HEADROOM.
2—STEERING WHEEL . . . right in the driver's lap.
3—NATURAL BACK SUPPORT . . . adjustable for maximum comfort.
4—PROPER LEG SUPPORT . . . under the knees where you need it.
5—CHAIR-HEIGHT SEATS . . . just like you have at home.
6—7-INCH SEAT ADJUSTMENT . . . with safe, convenient hand control.
7—"AIR-O-RIDE" CUSHIONS . . . adjustable to weight of driver and road conditions.

Set-Up Is Tightly Organized

The shop and equipment-repair division at Bull Shoals has been tightly organized to take all the guesswork out of mechanical and equipment repair. The organization makes use of a double-check system of inspection of all services or repairs.

Heading the organization is a mechanical superintendent, with a shop foreman, heavy-equipment foreman, and truck foreman under him. When the mechanics overhaul a piece of equipment, a mechanical inspector makes a record of the work and sees to it that the job is checked by the proper foreman before the machine goes out. This eliminates all the uncertainties of indifferent labor, because only one man is responsible for the job.

Unusual Jobs Done

Although not one cubic yard of concrete had been poured in the dam when the job was visited, the machine shop had put out an enormous amount of work. The concrete-batching plant was being rebuilt. Gantry cranes had been worked over. Diesel locomotives and cement cars were being rebuilt.

The big 25,100-pound steel shaft for one of the gyratory crushers had also been checked, turned down, and threads cut. To handle this monstrous piece of steel, special roller-bearing dollies were built to hold the rear end of the shaft. On one eccentric bearing for a crusher, a single pour of 1,200 pounds of babbitt was made..

Small jobs come in by the dozens. There are always odd parts to be fabricated, threads to cut, or anchors to be made. The volume of steel and blacksmith work on a job of this size is great. Steam cleaning precedes any major repair to uncover unseen defects.

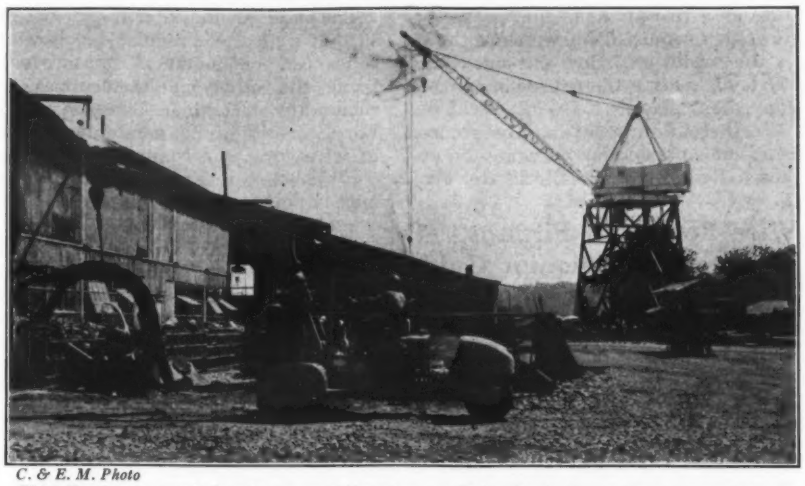
The two grease pits on the main repair floor do a big business, too, particularly at the end of each shift. All the fast-rolling stock runs in over these grease pits, and several skilled grease monkeys swarm over them. Lubricating and fueling take only a few minutes even for the big end-dump Euclids.

For those pieces of equipment that have to stay afield, a mobile lubricating and fuel unit makes its rounds day and night. Every machine is greased once a shift. Engine oil is changed every 80 operating hours, and filter changes are made frequently, particularly where the machines have to work in dust.

The contractors have now standardized on one brand of lubricating oil. Esso lubricants are used exclusively. Essolube HD-30 engine oil is used in all diesel and gasoline-engine crankcases. Other lubricants around the pits include Teresso 52, Esso Gear Oil SAE 140, Track Roller Lubricant H, and XP Compound SAE 140.

It might be mentioned here that not one main or connectng-rod bearing failed in any piece of equipment in the first 1,300,000 cubic yards of excavation. Two Caterpillar tractors, both D8's under heavy-duty work, went 1,735 and 1,600 hours respectively without losing a track roller. One Caterpillar engine on diesel-electric generation had run for 4,324 hours when the job was visited, and used no oil between 80-hour changes. Figured on the basis of 30 miles per hour, that engine had gone 129,720 miles and still needed no new rings.

Good equipment records are also a part of the machine shop. At any time of the day or night, the equipment superintendent can look at the master card on any piece of equipment and tell exactly what service and repair that machine has had in its lifetime. The shift mechanics make up field cards which are checked and posted by the inspectors. Since the mechanics have a job sheet to work from when they come on shift, it is easy for the inspectors to check the operation as well as the shift report. Nothing is omitted, either in the line of mechanical repair, service, or reports.



C. & E. M. Photo

This Hyster crane is handy around the shop at Bull Shoals Dam. Here it carries off a set of track rollers from a Caterpillar D8.

Spare engines for the Euclids are also stored in the shop, where they can be set in place easily, and the old ones overhauled at leisure. An ample stock of repair parts in the warehouse insures the least possible amount of "down" time in case any machine does have bad luck.

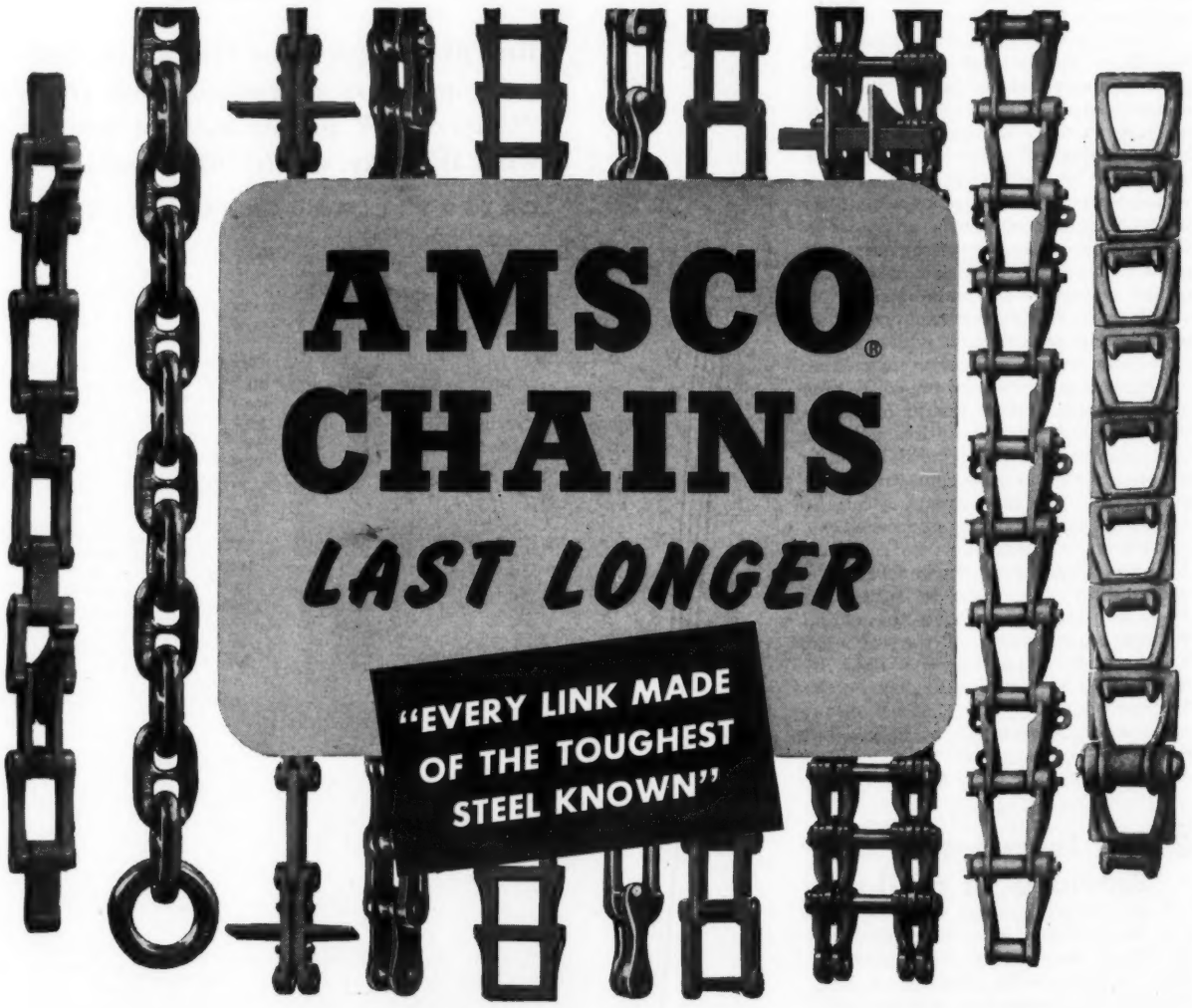
The project, when visited, was using 95 pieces of equipment, most of them quite heavy, and the equipment-maintenance system was clicking like clockwork.

Aluminum Wheelbarrows

Wheelbarrows with aluminum trays are the subject of a bulletin prepared by the Chattanooga Wheelbarrow Co., Main and Holzclaws Sts., Chattanooga, Tenn. The announcement points out the features of the aluminum construction, and other advantages claimed by the manufacturer for these wheelbarrows.

Specifications are listed for the two models which have rated capacities of 4½ and 6 cubic feet. Other specifications cover the size of tray, depth on slant, weight, and type of wheels. Literature describing the Model No. 48 brick barrow is also available.

Copies of this literature may be obtained from the company. Or use the enclosed Request Card. Circle No. 75.



Replacing ordinary elevating and conveying chain is a constant drain on profits . . . a constant source of production tie-ups and delays. Stop all these worries today by installing Amsco manganese steel chain in the really tough services. It often repays its own cost many times over by its tough resistance to breakage stresses and its outstanding wear resistance.

Here's the kind of service users report: 25 months with little wear versus 8 months; 27 months with 2 years' service left where ordinary chain lasted only 3 months.

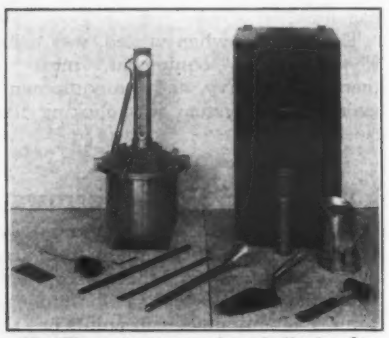
With a test-bar tensile strength of 125,000 lbs. (average test), high ductility, and a surface that work hardens to as high as 550 Brinell, Amsco manganese steel chain withstands severest stresses and grinding abrasion . . . it can be used without lubrication in dust-laden atmospheres.

Added to this is the Amsco engineering design experience that will help to meet your problem with the one best chain for trouble-free service. Write for Bulletin 742-CN . . . and let us quote on your requirements.

AMERICAN Brake Shoe COMPANY

AMERICAN MANGANESE STEEL DIVISION
CHICAGO HEIGHTS, ILL.

Foundries at Chicago Heights, Ill., New Castle, Del., Denver, Colo., Oakland, Calif., Los Angeles, Calif., St. Louis, Mo.
Offices in principal cities. In Canada: Joliette Steel Limited, Joliette, Que.



The Tarrant pressure-type indicator for measuring the air in air-entrained concrete is shown here with its accessories and carrying case. It comes in three models.

Indicator Measures For Air in Concrete

A pressure-type indicator for measuring the amount of air in air-entrained concrete is manufactured by the Robert Tarrant Mfg. Co., 329 W. Illinois St., Chicago 10, Ill. These indicators are made in three sizes: 0.22, 0.44, and 2.8 cubic feet. The gages are calibrated to read from 0 to 8 per cent.

Operation of the indicator is based on the Klein-Walker studies of measurement of entrained air by the pressure method. In making the test, a sample of fresh concrete is placed in the steel bowl, the conical cover is clamped in place, and the assembly is filled with water. Pressure is applied by a small air pump, causing compression of the air in the concrete. The amount of entrained air is then read directly as a percentage of the volume of the concrete.

A feature claimed for these indicators is the rigid construction which allows only very small expansion in volume during the application of pressure, thus giving a more correct result. The indicator is also provided with a cylinder of known volume which can be used to determine the correct operating pressure on the job, to compensate for the effects of rough handling and variations in barometric pressure.

As the aggregate in the concrete also contains air, this must be subtracted from the reading to give the actual entrained-air content of the concrete. This correction, which can only be determined by test, is also done in the Tarrant indicator.

Further information may be secured from the company, or by using the enclosed Request Card. Circle No. 105.

Safety Information Provided At a Glance

Safety information at a glance is the aim of a circular slide rule designed by the Davis Emergency Equipment Co., Inc., 45 Halleck St., Newark 4, N. J. This dial is designed to provide safety men with a quick reference guide on many details of safety practice and emergency information on industrial hazards.

The dial lists 45 mechanical operations encountered in construction and industry, and includes this information for each of them: the suggested equipment for protection of the head, eyes, and face; the safety equipment needed for body protection; and respiratory equipment. If harmful substances are used in the operation, this is pointed out so that measures can be taken to guard against their possible ill effects.

The Davis dial also lists 55 types of dangerous fumes, vapors, gases, dusts, etc. For each of these, it tells the probable safe concentration for an 8-hour exposure, suggested protection and control measures, usual method of entrance to the body, flash point, and lower explosive limit. Also included is a canister color chart and a listing of the uses and limits of various types of gas-protective equipment.

The dial is printed on a heavy-coated cardboard. The inner dial is turned until an arrow points to the specific information required. Answers are shown in the various window cut-outs. The Davis dials are eyeletted for hanging in convenient places.

Further information may be secured from the company, or by using the enclosed Request Card. Circle No. 67.

Wire Rope and Fittings; Strength-Indicator Guide

A pocket-size catalog on the complete Roebling line of wire rope and wire-rope fittings—as well as a slide-rule type of indicator for determining the remaining strength in used wire rope—has been made available by John A. Roebling's Sons Co., 640 S. Broad St., Trenton 2, N. J.

The strength indicator is constructed so that figures for regular-lay hoisting ropes can be computed on one side, while the other side determines the remaining strength in Lang-lay ropes. For determining the remaining strength in wire rope, the computor takes into consideration the nominal rope diameter, number of broken wires, and other factors of use.

Catalog No. A-893, a ninth reprint, contains a complete listing of the Roebling wire rope and wire-rope fittings. It describes wire rope and how it is constructed, right and left lays, and regular and Lang lays. It lists recommended uses for each type of wire rope, maintenance procedures, and other details. It also indicates the various sizes and styles in which each rope and fitting can be supplied.

This material may be obtained by writing directly to the company. Or use the enclosed Request Card. For the remaining-strength indicator, Circle No. 90; for the catalog on wire rope and wire-rope fittings, Circle No. 91.

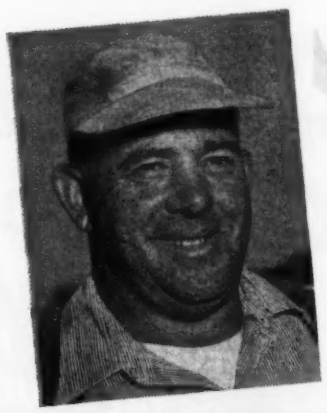
Asphalt Researcher Dies

Frederick C. Field, for 23 years asphalt chemist of The Asphalt Institute, died recently at the age of 72. Mr. Field was co-inventor of the Hubbard-Field stability machine. He also helped develop a successful asphalt riverbank revetment technique. His active work with the Institute was concluded with his retirement on December 31, 1946.

Users write a

Recent surveys show that an overwhelming majority of owners and operators of earthmoving tractors and equipment prefer "Caterpillar" products. The lists of "Caterpillar" users, and what they say, would fill a book. Here are a couple of "pages."

CATERPILLAR TRACTOR CO., PEORIA, ILLINOIS



"We took our new 'Caterpillar' 'dozer on 30-day trial, and now you couldn't take it away from us. It's easily tilted and really rolls the dirt. We produce approximately 1½ million board feet a month during the summer."

HARRY WIER, *Superintendent*, Arcata Redwood Company, Arcata, California.

"We have been reclaiming sunken logs from the bottom of a drained pond. Working in 3 feet of mud, we get 65 to 70 thousand board feet daily. I've been driving tractors for 14 years and know that a 'Caterpillar' Diesel will put out more board feet and really hang together."

DONALD E. SNYDER, operator for Snyder & York, Nevada City, California.

"For economy of operation and ability to turn out work, my new 'Caterpillar' outfit is tops. Hourly fuel cost of the D7 averages 39 cents."

ALFRED PEREIRA, Walnut Creek, Calif.

Note—Outfit also includes a No. 70 Cable-controlled Scraper. Unit carries an average load of 11 loose yards; makes 18 to 20 trips per hour on 500-ft. haul.

"We use several pieces of 'Caterpillar' equipment for material handling. One of the Diesel engines (a D8800) which powers the Dominion Hoist has operated almost 16,000 hours without repairs."

J. LUCIEN COMTOIS, *Master Mechanic*, Dominion Coal Co., Montreal, Quebec, Can.

"This new 'Caterpillar' D8 Tractor really paid off for us when the chips were down. Operated 24 hours per day for 6 weeks with engine shut off only long enough for oil changes. We've had excellent service from our other 'Caterpillar' track-type Tractors, too."

"JACK" VIRGIL ANDREWS, *Supt.*, Coit Ranch, Inc., Firebaugh, California.

"I operate my 'Caterpillar' Tractor 6 to 18 hours a day. It will chisel an acre or disc five acres per hour at a fuel cost of 27 cents."

CLARENCE DANIELSON, Woodland, California.

Note—Mr. Danielson's tractor is the first "Caterpillar" Diesel purchased for farm purposes. He acquired it after it had served its former owner 15 years, or 27,000 hours.

Air-Operated Drill Is Mounted on Wheels

A pneumatically operated wagon drill was introduced at the Road Show by the Independent Pneumatic Tool Co. of Aurora, Ill. The Model BW-1 is mounted on a 2-wheel chassis and features a high degree of portability. Standard equipment includes a Thor Model 105 drifter drill with a chuck for 1¼-inch round-lug steel.

According to the manufacturer, the Thor drill has a nominal steel change of 6 feet and an actual feed travel of 8 feet. Regular road gage is 4 feet 8½ inches; it is 3 feet 4½ inches with the wheels swiveled inside. The unit is 8 feet in length, 5 feet 10 inches in greatest width, and has a height when drilling of 10 feet 6 inches. Total weight of the unit is 1,425 pounds.

Further information may be secured from the company, or by using the enclosed Request Card. Circle No. 49.

Weather-Protective Cabs

Cab protection against rain, snow, and cold is important for tractor operators if they are to maintain a high degree of efficiency. One line of convertible cabs is made by Allen Industrial Products, Inc., of Battle Creek, Mich., and is described in a new bulletin just released by the company.

The bulletin tells about the features of the cabs and illustrates their convertibility to winter or summer use. The folder also lists the construction details of the Allen cab and the mounting attachments which are available. These will fit the International Harvester Models I-4, ID-4, I-6, ID-6, I-9 and ID-9; the Minneapolis-Moline RTI and UTI; the J. I. Case Models DI, DI-NT, LAI, SI, VAI, and VAIW; and the Oliver Models 60, 70, and 88.

Copies of this literature may be obtained from the company. Or use the enclosed Request Card. Circle No. 86.

Worthington Ups Anderson

The Worthington Pump & Machinery Corp. announces the appointment of Harold T. Anderson as Assistant to the General Sales Manager, in charge of Sales Production Relations. He will have his headquarters at Harrison, N. J.

The new Johnson elevating cement charger can be dismantled, moved, and set up for operation without the use of cranes or auxiliary equipment. A standard dump truck is used for transport.

Cement Unloader Is Highly Portable

A highly portable elevating charger for unloading cement from boxcars or hopper-bottom cars was exhibited at the Road Show by its manufacturer, the C. S. Johnson Co., Champaign, Ill. —a subsidiary of the Koehring Co. It can be dismantled, moved, and set up for operation without the use of cranes or auxiliary equipment. A standard dump truck, used as transport, erects the one-piece elevator unit. Capacity of the plant is 300 barrels an hour rated with the buckets 80 per cent filled, plus moderate facilities for storage to allow for moves of railway cars without interrupting batching.

Standard equipment on the plant includes gasoline-engine drive or electric motor, as well as a 1,000-pound-capacity weigh batcher and boxcar receiving hopper. A 10-inch adjustable-height screw conveyor unloads hopper-bottom cement cars. Clutch and throttle controls extend to the operator's platform, and a small air compressor attaches to the engine for cement aeration.

As an optional feature, the upper hopper can be equipped with two weigh batchers for increased speed in loading two-compartment batch trucks. For increased storage capacity when the unit is used as a car-unloading transfer plant without batchers, a 50-barrel-capacity extension section can be bolted to the upper hopper. For boxcar delivery of cement, a car-unloading hopper and power scraper unit is available.

Further information may be secured from the company, or by using the enclosed Request Card. Circle No. 11.

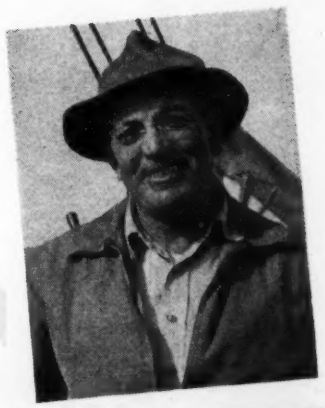
FWD Sales Organization Outlined at Convention

A meeting of sales and service representatives—the second annual gathering of its kind—was recently held at the Clintonville, Wis., plant of The Four Wheel Drive Auto Co. Those attending were told about the increased productive capacity of the FWD plant, and about plans for doubling the size of the company's engineering staff to accelerate product development. They also were told of one new truck model—the ZU, which is in production—and were shown the pilot model of another, the 28,000-pound Model YU.

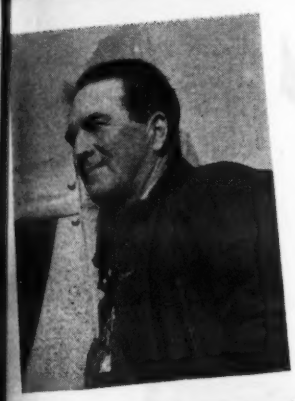
The salesmen learned also of a development in the sales policy of the company. For the past three years, the FWD sales organization has operated under a 6-zone domestic system with other zones outlined in the company's world market. Each zone is under a zone manager and salesmen stationed by geographical subdivisions. This basic organization will not be changed but will be amplified by a system of market specialists. Their job will be to specialize in the application of FWD trucks to certain types of jobs so that they can aid customers in choosing the proper truck for a specific job.

te a book

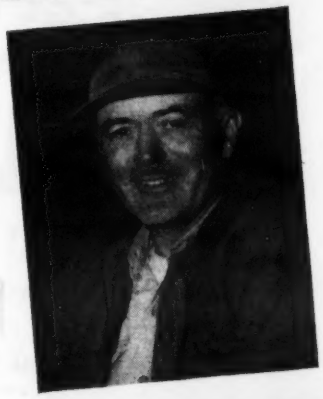
"Whether I buy equipment for use on my farm or in my capacity as County Commissioner, I always insist on 'Caterpillar'."
HARRY S. WADE, *County Commissioner*, Lostine, Oregon.



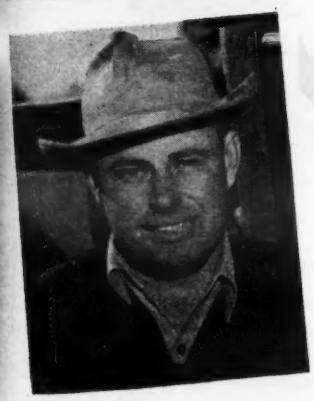
"I've used 'Caterpillar' equipment for 15 years and, believe me, for day-in-and-day-out use you get more work out of it than from any other equipment I know of. 'Caterpillar' Diesels can take punishment and still do the job well."
A. W. "TONY" CLAUDINE, *Supt.*, A. J. Peters & Son, San Jose, California.



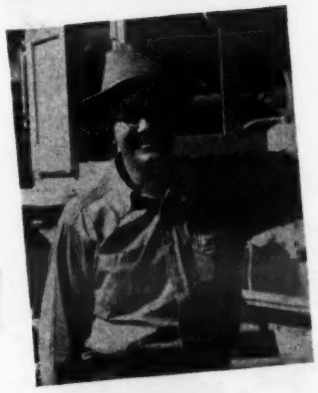
"I've used 'Caterpillars' since 1918 and I'd certainly recommend them to anybody. I believe 'Caterpillar' track-type Tractors are built more rugged and have more stamina to stay on the job day and night. They're almost foolproof despite the variety of operators."
M. F. LEMEN, Woodland, California.



"I own three 'Caterpillar' track-type Tractors and have a new D6 on order. From my experience I know that 'Caterpillar' Diesels will stand up well in tough, muddy work."
WAYNE A. SMITH, Chico, California.



"There's no slip or slide with our new 'Caterpillar' No. 80 Cable-controlled Scraper. It's easy on cable, loads better than any I ever saw, dumps easily, and will travel sand slopes without sliding over. We use it for leveling, grading and industrial excavation."
LOUIS H. ROBERTS, *Superintendent*, Macal Improvement Co., Antioch, Calif.



"My opinion is based on ten years' experience with 'Caterpillar' Diesel products. I think they are the best made for road building and maintenance. I especially like the added power of the new 130-hp. D8."
MIKE DINKEL, *County Engineer*, Greeley, Kansas.

CATERPILLAR
REG. U. S. PAT. OFF.
DIESEL ENGINES • TRACTORS
MOTOR GRADERS
EARTHMOVING EQUIPMENT

Second International Conference on Soils

Delegates From All Over the World Gather in Holland to Correlate Their Studies in Soil Mechanics

By Professor RAYMOND F. DAWSON, Acting Director, Bureau of Engineering Research, University of Texas

✦ THE Second International Conference on Soil Mechanics and Foundation Engineering was held in Rotterdam, Holland, from June 21 to 30, with a total registration of 591. The 42-member American delegation represented the U. S. Engineers, the Bureau of Reclamation, and many universities and colleges as well as engineering and educational societies. In the absence of Professor P. C. Rutledge, Chairman of the U. S. National Committee, Vice Chairman T. A. Middlebrooks acted as Chairman of the delegation. Dr. Karl Terzaghi of Harvard University is the permanent President of the Conference.

As Dr. Terzaghi pointed out during the Conference, in the old days only judgement was available as a tool or guide in the solution of earth-work and formation problems. It was assumed that foundations would not settle and that embankments could be made with no resulting settlement. If in either case settlement did occur, it was considered an act of God.

But the science of soil mechanics has changed all this. It has furnished detailed information on the magnitude, distribution, and rate of settlement. It has provided opportunity to measure strains in soils and to study cohesive soils. Moreover, with the First International Conference on Soil Mechanics, held at Harvard in 1936, came an opportunity for various nations to correlate their studies of the subject and exchange ideas.

For the exceptional job done in organizing and conducting the Second International Conference, a great debt of gratitude is due to Ir. J. P. Van Bruggen, Chairman; to Ir. T. K. Huizinga, Secretary; and to the staff. Their efforts were repaid, at least in part, by the high character of the papers which were presented.

Technical Sessions

Two technical sessions were held each day in the Palace Theater of Rotterdam. The major ones dealt with earth construction, earth pressure, and ground water; raft and pile foundations; investigations in the laboratory and in the field; roads, runways, and soil stabilization; and theoretical subjects. At each session, a paper was presented on unusual engineering problems in Holland, followed by a meeting of certain sections of the Conference.

The following papers were presented by the Dutch Engineers: "Closing of the Gaps in the Dikes of Walcheren", by Prof. Ir. P. Ph. Jansen; "Harbor Reconstruction at Rotterdam", by Ir. D. H. de Herder; "Stabilization of Railway Embankments Near Gouda", by Ir. J. L. A. Cuperus; "Construction of the Maastunnel at Rotterdam", by Ir. J. P. van Bruggen; "Road Construction on Soft Subsoils", by Ir. H. A. M. C. Dibbits; and "Geology of the Netherlands in Connection With Soil Mechanics", by Ir. T. K. Huizinga.

Inspection Tours

After the technical sessions closed on Saturday, June 26, inspection tours were made to the tunnel under the Maas River and harbor reconstruction at Rotterdam; to the polders of north Holland including the new Wieringermeer polder and the dike closing of the Zuiderzee; and to the canals, harbors, and airport at Amsterdam. The damage done to the polders by flooding and to the harbor facilities was tremendous, and all the delegates were impressed by the remarkable amount of reconstruction which has been accomplished since the liberation.

Evening Programs

The evening programs included opening and farewell dinners, visits to the Soil Mechanics Laboratory at Delft, an official reception by the Burgomaster of Rotterdam followed by a dinner and concert offered by the Municipality, and an official reception by members of the Government at the Hague.

Business Meeting

At the business meeting, articles were adopted for the governing of the permanent international organization to be known as International Conference on Soil Mechanics and Foundation Engineering. In the intervals between conferences, the chairman of each national committee will be required to make a yearly report. The national committee

(*Concluded on next page*)

A Roller For Every Job

Sturdy, heavy-duty rollers, engineered to stand up under the toughest conditions. Pierce-Bear Tandem Rollers are powered by economical Allis-Chalmers 4-cylinder industrial type gasoline engines. Variable weights, from 3½ to 5 tons with built-in water tanks for ballast and wet rolling.

Pierce Medium Bear 3½-5 tons

Pierce Baby Bear 2½-3 tons

The new 2½-3-ton Pierce Baby Bear is designed for close-in work and small area maintenance. It works against a curb up to 25 inches high and within 1½ inches of a higher wall or building. Final drive is within the rear roll. Use Pierce-Bear Tandem Rollers for all-around performance. Write for folder.

Pierce-Bear Rollers
Lewis Manufacturing Company
415 Hoefgen Avenue—San Antonio 6, Texas

ENGINE BULLETIN
1472
the 190-GL SIX
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SIX CYLINDER ENGINES
for all Heavy-Duty Power-Driven Machinery
WAUKESHA MOTOR COMPANY • WAUKESHA, WIS.
Eastern Sales Office: Eight W. 40th St., New York 18, N. Y.
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190-GLU Standard Gasoline Power Unit

Expanding a design already proved by arduous work-outs in industrial machinery on the job, the 190-GL Six is the result of more than 40 years of experience with a long line of engines of the same type. It's a heavy-duty 3¾ in. x 4 in., 265 cu. in. industrial six. Simple and accessible . . . rugged and rigid . . . streamlined to fit your equipment and packed with power to drive it. Built to keep from growing old—with wet cylinder sleeves and all other major parts *renewable*. Overhead valves! Advanced oiling system combines moderate pressure, metered-jet, and nozzle delivered spray. Waukesha centrifugal governor is gear driven, pressure oiled, completely enclosed. *Get the story in Bulletin 1472.*

WAUKESHA MOTOR COMPANY, WAUKESHA, WISCONSIN
NEW YORK TULSA LOS ANGELES

members named for this conference are to form the nucleus of each permanent national committee. Also, the time and meeting place for the next conference will be decided by the executive committee, which consists of one representative from each country.

Side Trip to England

Following the Conference, a number of the delegates visited England where the British National Committee on Soil Mechanics and the Institution of Civil Engineers arranged a 2-day inspection tour. Visits were made to the soils laboratories of the Building Research Station and the Road Research Laboratory of the Department of Scientific and Industrial Research, Imperial College of London University; and to Soil Mechanics, Ltd., and George Whimpey Co.—organizations which are directly connected with contracting firms.

Conference Publications

Copies of the proceedings of the Conference may be obtained by addressing Ir. T. K. Huizinga, Director, Laboratories of Soil Mechanics, Oostplantsoen 25, Delft, The Netherlands. Five volumes were published before the Conference; a sixth volume will contain the discussions; and possibly a seventh volume will be published to include the late papers.

At the time of the Conference, the Editorial Committee had received 417 papers, of which 361 were published in the first five volumes of the proceedings. The U. S. A. contributed 109 of these papers, 57 were from England, 39 from the Netherlands, 25 from France, 24 from Switzerland, 13 each from Australia and Austria and Belgium, and a lesser number from each of 19 other countries. The truly international scope of the Conference was emphasized by the fact that papers were received from 27 different countries.

Electric Hand Tool Does Drilling, Cutting, Grinding

A catalog on its Handee electric tool and complete line of accessories can be secured from the Chicago Wheel & Mfg. Co., 1101 W. Monroe St., Chicago 7, Ill. The accessories include drills, cutters, and grinding, sanding, and polishing wheels.

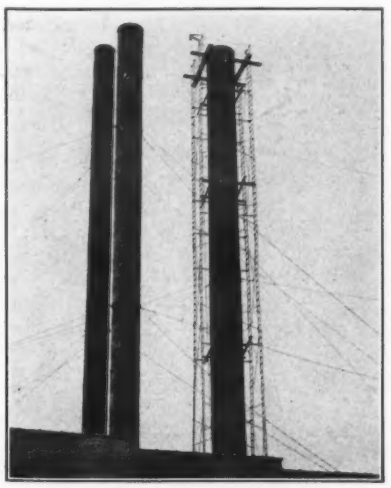
The de luxe model Handee weighs 12 ounces, turns up to 25,000 rpm, and will handle accessories with shanks up to and including ⅛ inch. The Model No. 44 weighs 2 pounds, turns up to 20,000 rpm, and is used with accessories having a ⅛-inch shank. The Hi-Power grinder weighs 3 pounds, turns up to 17,000 rpm, and can be used with wheels having diameters up to 2½ inches.

The catalog describes each of these tools in detail, and includes a complete listing of the Chicago line of wheels, which are made in a wide range of styles and shapes to meet many purposes. Catalog No. F-980 also describes available accessories.

Copies of this literature may be obtained from the company. Or use the enclosed Request Card. Circle No. 58.

Adjustable Scaffolds

A line of equipment for use in building construction and maintenance is announced by Bil-Jax, Inc., Archbold, Ohio. Made of tubular steel, the Bil-Jax line consists of scaffolds, lean-to ladders, maintenance trestles, adjustable scaffold horses, and ladder jacks.



A Bil-Jax tubular-steel scaffolding is erected 86 feet high for construction of a steel smokestack.

According to the manufacturer, this equipment features adjustability and flexibility in its application. Individual parts can be quickly assembled into a complete scaffold to give any desired height with rigidity and safety. All joints have been electrically welded.

Further information may be secured from the company, or by using the enclosed Request Card. Circle No. 100.

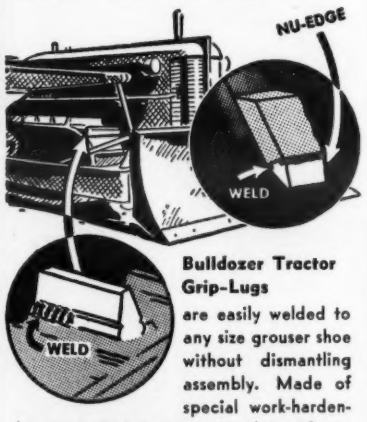
Haiss Names Sales Agents

The appointment of John F. Day as Sales Representative is announced by the George Haiss Mfg. Co., Inc., a division of the Pettibone-Mulliken Corp. Mr. Day will handle the complete line of Haiss conveyors, car unloaders, and loaders in the northwestern sections of New York and Pennsylvania. His office is located at 1060 Kenmore Ave., Buffalo, N. Y.

J. Benatar, 232 E. 86th St., Brooklyn, N. Y., is named Sales Representative for the five boroughs of New York City. And H. D. Williams of 6212 Homer St., Philadelphia 44, Pa., is the Haiss agent in eastern Pennsylvania and southern New Jersey.

SAVE and INCREASE TRACTOR POWER

The Bulldozer Blade Nu-Edge Bar is butt-welded to new or worn blade and welding bead covered with a thin layer of hard-surfacing electrode—Affording 2000% savings in blade replacements.



Bulldozer Tractor Grip-Lugs are easily welded to any size grouser shoe without dismantling assembly. Made of special work-hardening steel which becomes tougher with use —outwearing original grouser.

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ALLIED STEEL PRODUCTS, INC.
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4 BRAND NEW MICHIGAN TRUCK SHOVEL-CRANES... SERIES 8

½ YARD
8 TON

Here's a range of four completely new half-yard MICHIGANS designed to meet *your* particular job requirements. Your choice of *single-engine* power or *twin-engine* power, *two-wheel drive* or *four-wheel drive*. Remote control, which permits fast, easy maneuvering on the job, is available as optional equipment on the twin-engine models.

Get all the facts! Write for your copy of Bulletin 101.

MICHIGAN

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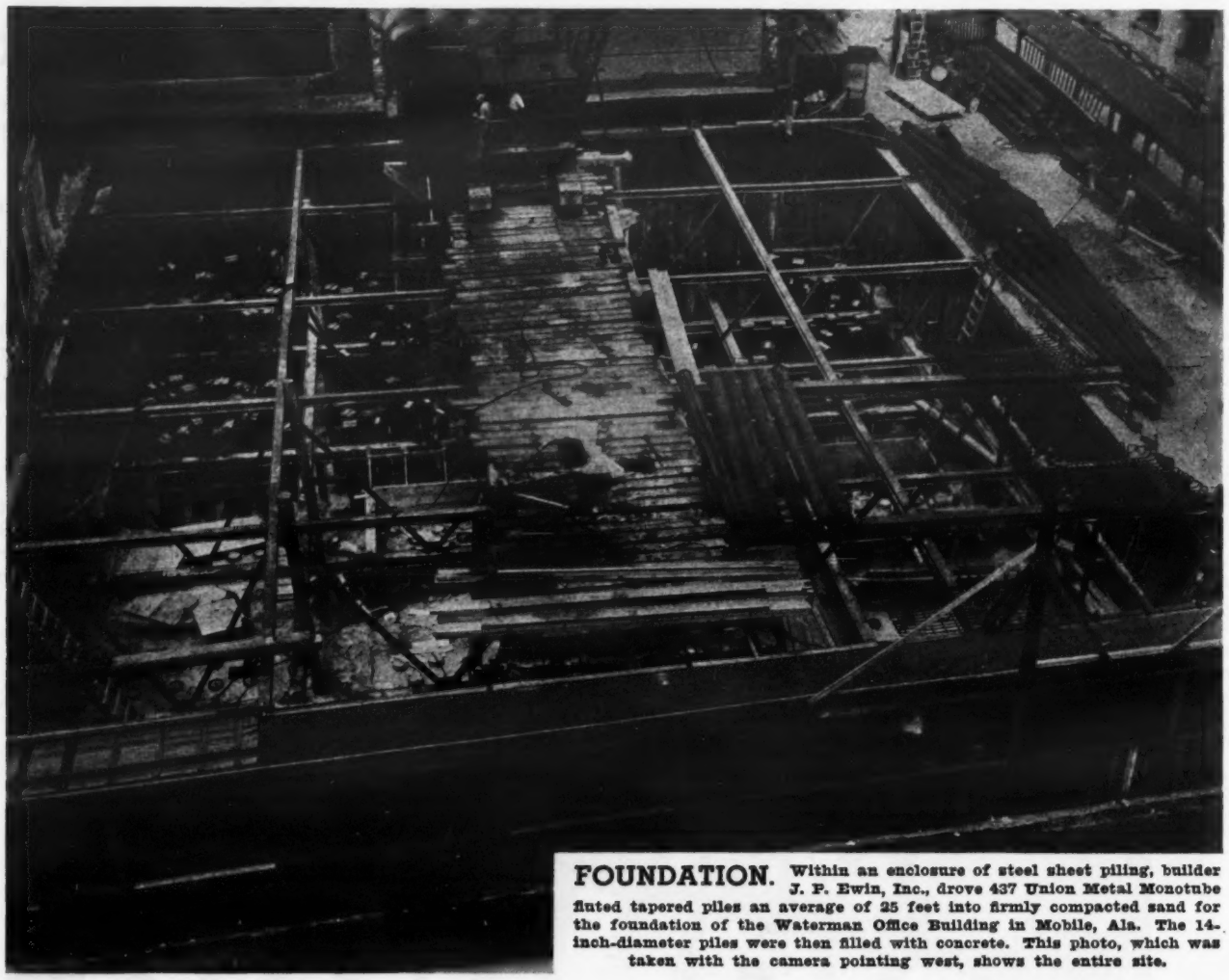
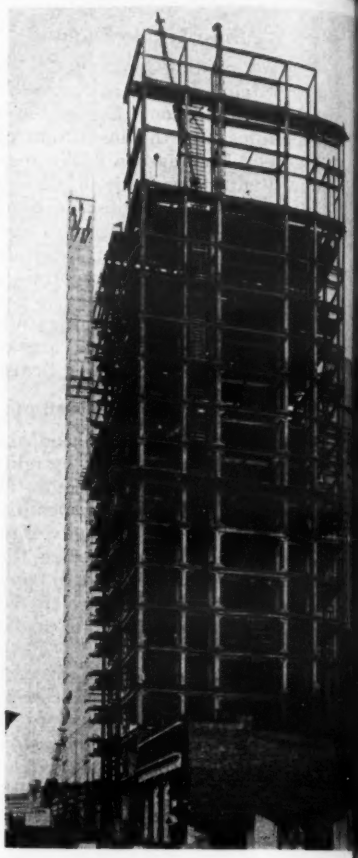


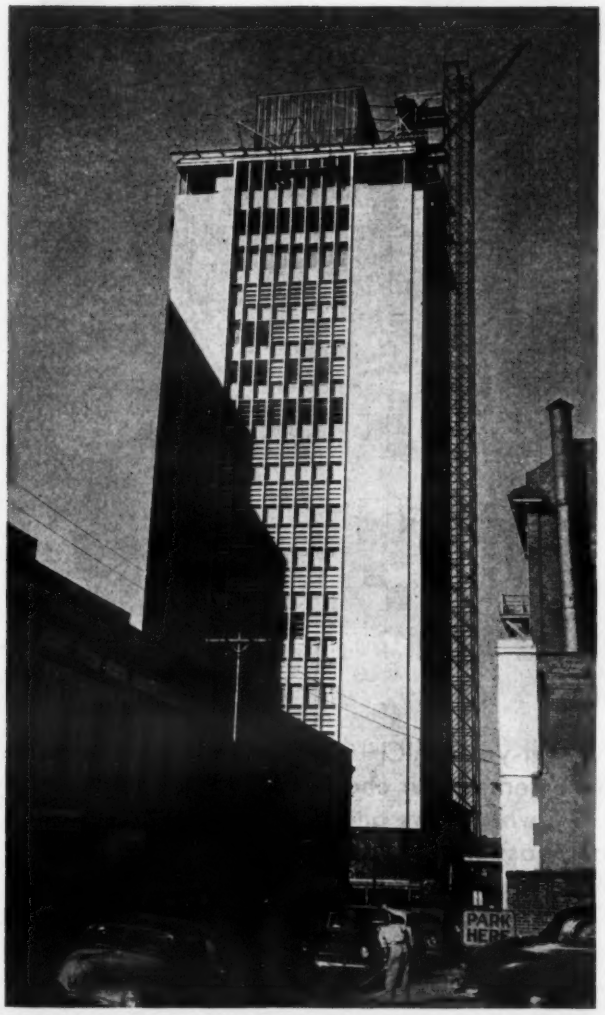
FOUNDATION. Within an enclosure of steel sheet piling, builder J. P. Ewin, Inc., drove 437 Union Metal Monotube fluted tapered piles an average of 25 feet into firmly compacted sand for the foundation of the Waterman Office Building in Mobile, Ala. The 14-inch-diameter piles were then filled with concrete. This photo, which was taken with the camera pointing west, shows the entire site.

FRAMEWORK. A guyed derrick hopped upward stories, handled the 1,500 tons of structural in the framework. Altogether, 27 columns All steel members were connected by rivets fireproofed with premolded 2 to 3-inch slabs rials were raised in a 240-foot-high hoist hod hoist which was built of steel

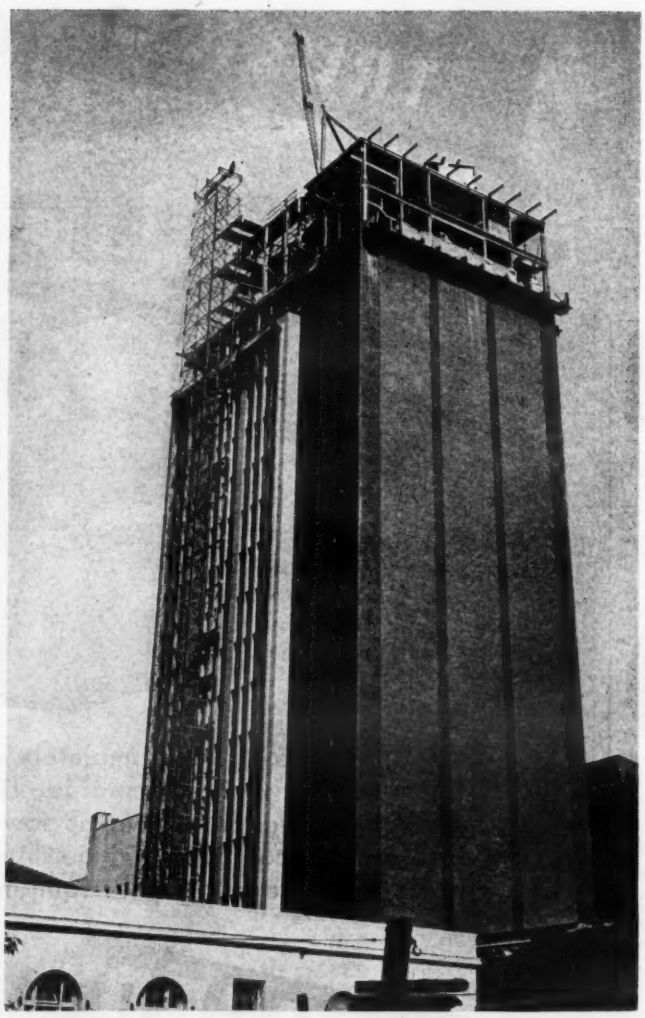


New Office Building Is Up-to-D

Modern 18-Story Struc Cellular Floor Design Exteri Cor



EAST WALL. The buff-colored architectural stone blocks, shown here on the east wall, are 4 inches thick and average 30 square feet in area. They consist of a reinforced cast stone made with white portland cement, using granite and silica for aggregate. The grouped windows are separated by mullions of coral-colored architectural stone.



WEST WALL. Moving around to the northwest corner of the building, we see the windowless west wall of 8-inch dark-red face brick, offset by decorative bands of architectural stone and backed with structural load-bearing clay tile. A bank of four elevators is set in this wall. The insides of all exterior walls of the building are dampproofed with Par-Lock.

FLOORING. A Robertson Q floor system of lightweight cellular steel was welded to the floor beams, with 3½-inch-deep cells or ribs on 6-inch centers. (This picture shows the 15th floor.) Then a lightweight concrete made with vermiculite aggregate was laid 2 inches thick over the tops of the cells and surfaced a few days later with ⅝ inch of regular concrete.

MATERIAL HANDLING. This view on the roof of the office building shows the top of the hod hoist at right, and a tripod-type stiffleg derrick with a 40-foot boom at left. This rig, with a capacity of 4 tons at a 28-foot radius, was set up to handle the architectural stone used on the north, south, and east outside walls of the structure.

(C. & E. M. and Overbey Studio Photos)

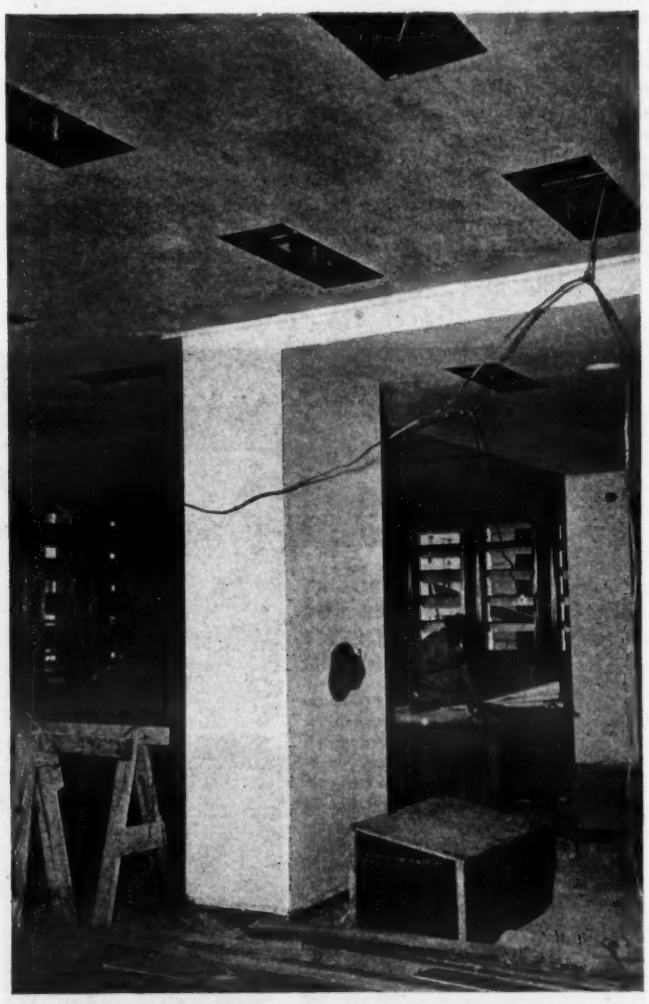
(See article on page 5)

to Date

Structure in Mobile, Ala., Features Lightweight oor Design and Special Windows, Shutters, Lighting; xteri Combines Red Brick and Buff Stone

OUND FLOOR. The columns of the ground-floor lobby are en- with opalescent granite. And above them, along orth (right) side of the building, is a 4-foot over- Each of the 12 windows on the north side has a l shade in its center; the 8 on the east (left) e have a special venetian-blind type of shade.

WINDOWS. Aluminum venetian-blind-type shades protect the east and south sides of the building from the hot sun of long Alabama summers. Though not installed when this picture was taken, dustproof and weatherproof Sealuxe Thermo windows of double glass panes separated by a ½-inch dehydrated air space are another f- e of the building.



LIGHTS, ACOUSTICS. These 1 x 3-foot openings in the suspended ceiling are for fluorescent lights. The dropped inner portion of the ceiling to the right of the column has been covered with ½ inch of Macoustic fireproof acoustical plaster. The rest of the ceiling will be covered with Acousti-Celotex acoustic tile. In addition to its other modern features, the $3,500,000 building is air-conditioned throughout.

"What I can't figure is how they know which way we're going next?"

Pamphlet on Load Tests Of Soil Bearing Capacity

Load tests to measure the bearing capacity of soil masses have become increasingly important in engineering practice in spite of wide diversity in test procedure, methods of analysis, and application of results in design. A discussion of this subject took place at the 50th Annual Meeting of the American Society for Testing Materials, and the technical papers presented at this symposium, with the discussions relating to them, have been published in pamphlet form by the ASTM as Special Technical Publication No. 79.

Among the subjects discussed in the pamphlet are field loading tests to evaluate the wheel-load capacities of airport pavements; methods of testing soils for runways and foundations; use of load tests in the design of flexible pavements; field bearing tests applied to pavement design; a cyclic load-test procedure; and a Canadian investigation of load testing applied to pavement design.

Each of the reports is thoroughly illustrated with drawings, pictures showing test procedures, and charts showing test results. The bibliography lists 76 references on the subject, and 20 pages of the booklet are devoted to a general discussion of bearing capacity by recognized authorities in the field.

Copies of the booklet can be obtained by writing to the American Society for Testing Materials at 1916 Race St., Philadelphia 3, Pa. It costs $3.00.

Light-Duty Scraper Made in Two Styles

Two new Speedhauls were introduced at the Road Show by the Be-Ge Mfg. Co. of Gilroy, Calif. These hydraulically controlled units are designed for high-speed light-duty scraper operations. The Model SS-760 is for use with wheel tractors, and the Model ST-760 is for track tractors.

Both models have a 6-cubic-yard heaped capacity and require a tractor with a 40 to 50-hp drawbar pull. Forced roll-out ejection, controlled cut and spread, and fully hydraulic operation are features claimed for the Series 760 Speedhauls.

Width of cut is 7 feet; depth of cut is 8½ inches; depth of spread, 11¾ inches; ground clearance, 11¾ inches. Wheel tread is 5 feet 8 inches, and 12.00 x 20 12-ply tires are standard equipment. Approximate weight of the Model SS-760, including hitch and hydraulic power-control unit, is 7,170 pounds; of the Model ST-760, 7,160 pounds.

Further information may be secured from the company, or by using the enclosed Request Card. Circle No. 52.

Scaffold Engineers

A scaffolding-erection service is offered by Chesebro-Whitman Co., Inc., 38-21 Twelfth St., Long Island City 1, N. Y. This company can furnish equipment and layouts designed to meet all types of conditions. Its services include the erection of hoisting towers, scaffolds for external work on large and small buildings, scaffolds for interior repairs and modernizations, prefabricated sectional scaffolds, and others. The company also can furnish portable field offices, large-size portable tool boxes, heavy jacks for brick setters, sawhorses, trestles, and other similar equipment for use by contractors.

Further information may be secured from the company, or by using the enclosed Request Card. Circle No. 19.

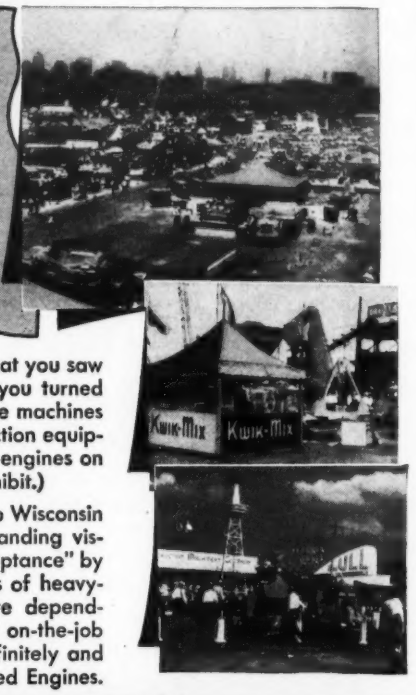
Plows for Winter's Fight

A folder describing three series of snow plows can now be obtained from the Good Roads Machinery Corp. of Minerva, Ohio. These are the Series No. 500 Trailmaker V-type plows; the Series No. 700-X Sno-Chaser one-way plows; and the Series No. 100-X Sno-Dozer reversible plows.

The folder features a description of the push-button control used with these front-end hydraulic plows. It shows how the hydraulic unit is installed in a truck, how the fingertip-control button is used to raise the plow, and how a turn of a valve allows the plow to settle to the ground. It shows views of the plows, front and rear, and illustrates how they are mounted onto trucks. Principal parts described in detail are the front-frame push, the twin booster rams, and the standard underframe.

Copies of this literature may be obtained from the company. Or use the enclosed Request Card. Circle No. 3.

WISCONSIN Air-Cooled ENGINES.. STOLE THE ROAD SHOW



If you were there, you will recall that you saw WISCONSIN ENGINES wherever you turned . . . as standard power units on the machines of no less than 51 different construction equipment exhibitors, for a total of 185 engines on display (not including our own exhibit.)

No greater tribute could be paid to Wisconsin Air-Cooled Engines than this outstanding visual demonstration of "popular acceptance" by leading manufacturers of all types of heavy-duty motorized equipment. Where dependability and "Most H. P. Hours" of on-the-job service count, the preference is definitely and dominantly for Wisconsin Air-Cooled Engines.

WISCONSIN MOTOR CORPORATION
World's Largest Builders of Heavy-Duty Air-Cooled Engines
MILWAUKEE 14, WISCONSIN

SYNTRON
Gasoline Hammer
PAVING BREAKERS

Busting

Cutting

Digging

Tamping

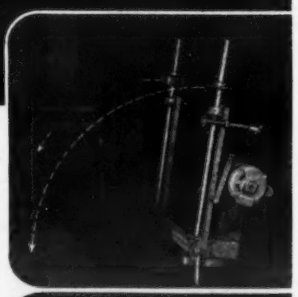
Save Money and Time

Whether you're busting concrete, cutting asphalt, digging clay or shale, or tamping backfill.

Write for descriptive folder

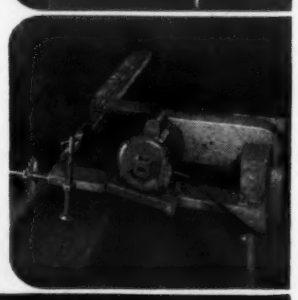
SYNTRON CO.
227 Lexington Ave. Homer City, Pa.

A NEW DEVELOPMENT WORTHY OF Your CONSIDERATION



THE SAFE-T-MILL
SELF-POWERED FOR SAFE, EFFICIENT LUMBER HANDLING

Here is a pair of mechanical hands specially designed for saw mills, building trades, industrial maintenance, woodworking shops, furniture industries, etc. It will handle finished lumber without marring. Automatic feed operations include bevel rip, plough, rabbet, bevel rabbet and moldings. It is adaptable to radial saws and the major types of table top saws. Send for illustrated folder.



POWER DEVELOPMENT CO., INC.
6719 DENISON AVENUE, CLEVELAND 2, OHIO

The Work That Diesels Do

Two new catalogs on the use of diesel engines have been released by the Caterpillar Tractor Co., Peoria 8, Ill. One of these discusses Caterpillar diesels used to provide power for crushing and screening plants; while the other deals with the general use of diesel engines as a power source for operating many types of equipment. Form No. 11467 is entitled "The Power for Crushing and Screening Plants", and Form No. 11463 is entitled "Caterpillar Diesel Engines and the Work They Do".

These catalogs show many pictures of job installations. They illustrate the wide range of applications for diesel engines, and indicate the choice of sizes and styles available from Caterpillar. The catalogs also include job notes on the peculiarities of each installation, and on how the engine is being used to best advantage.

Copies of this literature may be obtained from the company. Or use the enclosed Request Card. Circle No. 119.

Data on Portable Heaters

Readers who are now taking inventory of their cold-weather equipment may be interested in a catalog on portable heaters, which is available from The Herman Nelson Corp. of Moline, Ill. Catalog No. 2703 stresses the wide range of applications for the Nelson portable heating units.

The catalog shows these units in use keeping freshly poured concrete warm until initial set has taken place; heating a canvas-covered shelter under which bricklayers are at work in zero temperatures; heating freight cars and van-type trucks for ease in unloading; warming engines of equipment left standing outside; heating maintenance shops and garages; drying materials; spot-heating; and many other uses.

The catalog describes and pictures each of these job operations fully, and concludes with a summary entitled "A New Outlook for Winter Construction".

Copies of this literature may be obtained from the company. Or use the enclosed Request Card. Circle No. 45.

Thew Vice President Dies

Don G. Savage, General Sales Manager and recently elected Vice President of The Thew Shovel Co., died July 25 of a heart attack. He was also a member of the company's Board of Directors. At the time of his death, Mr. Savage was 50 years old. He had been with the company for 28 years.

FOUNDATION SECURITY
CAISSON PILES

Western's Caisson Piles have never failed

WESTERN'S Caisson Pile is placed by pile driving methods. Thus it has the characteristics and advantages of both types of foundations, namely:

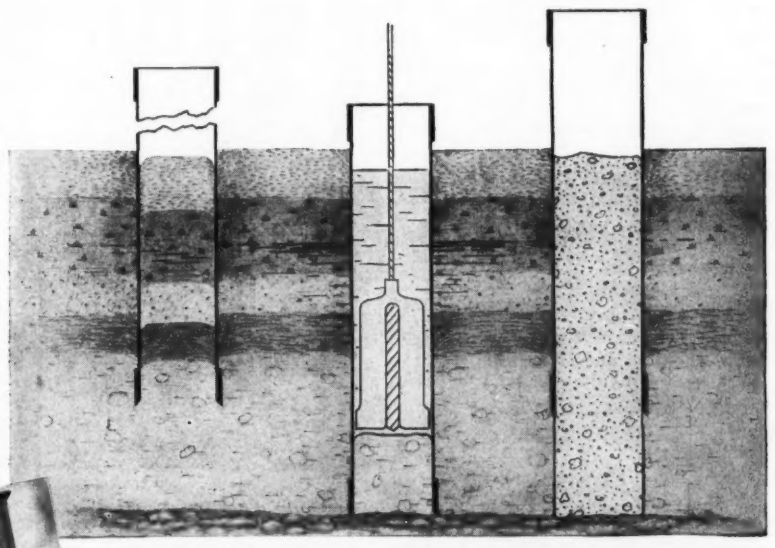
a. Very high supporting capacity because the full value of the concrete in the uniform cross-section can be utilized.

b. Adaptability to varied problems because diameters range from 24" to 36"; loads up to 400 tons per caisson pile.

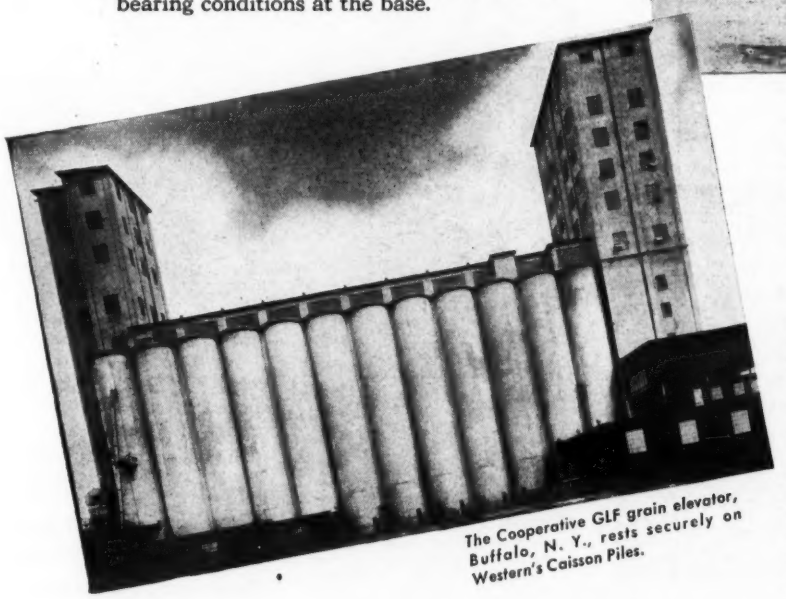
c. Economy in speed of construction and because caisson pipe is recovered.

d. Safety of personnel in construction.

e. Opportunity of thoroughly investigating the bearing conditions at the base.



A heavy steel caisson is sunk to rock. Boulders, when encountered, are broken by churn drill, and materials removed by sand pumps, bailers, etc. until the rock is exposed. • If hole is dry, surface of the rock is visually inspected; otherwise, it is tested by the drilling. • When cleaned, pipe is filled with concrete, either in the dry or by tremie, and withdrawn.



The Cooperative GLF grain elevator, Buffalo, N. Y., rests securely on Western's Caisson Piles.

DO YOU HAVE A FOUNDATION PROBLEM? Submit it to WESTERN. Our FREE CONSULTATION SERVICE affords the advice of foundation engineers who have put together a long record of unbroken success, handling every type of foundation problem under practically every type of soil, site, and load condition . . . *with not one single failure!* While WESTERN usually drives one of its exclusive types of foundations, where necessary a brand new variant will be created to solve your particular problem. Write for Catalog C.

FOUNDATIONS FOR

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WESTERN FOUNDATION CORPORATION

308 W. Washington St., Chicago 6, Ill. • 2 Park Avenue, New York 16, N. Y.

Class-Three County: Class-One Highways

Low Maintenance Budget Spreads Equipment Thin, But Experienced Crews Keep Roads in Condition

✦ NO doubt about it, the elderly farmer was angry. Storming into the office of Edgar Rapp, Jr., County Highway Engineer and Surveyor, in the courthouse at St. Charles, Mo., he shouted, "Which one of you fellers is the road boss?"

"I am", said the young, genial, heavy-set man at the desk. "Name's Rapp . . . Edgar Rapp. What's troubling you?"

"What's the idea of ruining my bridge?"

Rapp said easily, "Oh, now I place you. You're the fellow who farms that place where we just rebuilt the old bridge. Sure. We put on a new concrete deck to replace the dangerous old timber deck, and stiffened up some of the steel members with new braces. Part of our policy of road betterment, you know. Why, what's wrong?"

"What's wrong?" the farmer echoed, his face twitching with anger. "My mules won't go across that new white concrete, that's what's wrong. What are you going to do about it?"

Rapp said, "I'm not going to do anything. Neither will your mules, until you take yourself a shovel and go out there and throw a little black dirt over the new concrete. Then your mules won't be afraid. You ought to know that."

Almost every week these incidents pop up to plague the life of County Highway Engineer Edgar Rapp, Jr. Rapp at times is a surveyor, an engineer, a designer, a salesman, a counselor, a trouble-shooter, and a father-confessor. As custodian of the 650-mile highway system of St. Charles County, Mo., he comes up against many a problem of human behavior.

"What pleases one man makes another mad as hops", he said, smiling. "All you can do is build the roads up as good as possible with the money you have, and in the long run that will pay off in friendship better than anything else."

With this policy in mind, Rapp is truly lifting the 30,000 people in St. Charles County out of the worst mud in Missouri.

County Has Peculiar Problem

St. Charles County, west of St. Louis, is bounded on its two long sides by the mighty Missouri and Mississippi Rivers. Almost the entire eastern half of the county is flooded each summer when the rivers rise. Many a county road runs through river bottomland, where the soil is viscous, rich, and black. It is unequaled for farm land, but tough to build roads in.

The western half of St. Charles County is rolling hilly country, and there the road-building situation is somewhat better. But in any case the situation calls for ingenuity, because the hills have clay topsoil, and rock crushing costs money.

Road-improvement work has followed a pattern throughout St. Charles County over the years; today's accelerated work is merely an answer to today's accelerated traffic. In the beginning, the roads were graded in mud. Today, less than 2 per cent of St. Charles County's total mileage is old-style graded earth. Those old roads have given way to straighter ones now covered with crushed rock or gravel. About 88 per cent are this type. The other 10 per cent are modern road-mixed bituminous surfaces prepared on a granular base. Many of the armor coats are made by the surface-penetration method.

The county is primarily agricultural. Produce and stock from vast farms in St. Charles County move over county roads towards the St. Louis markets. Today, because St. Charles County has

(Continued on next page)

C. & E. M. Photo

In this scene of rural peace, a Caterpillar motor grader blades one of the county gravel roads in St. Charles County, Mo.

Relocation Job in Eastern New York

As first step in clearing the way for 36-ft-span bridge, crawler crane, equipped with clamshell bucket and sturdy wire rope, scoops heavy load of gravel from creek bed.

To cut path for new highway, drill steel goes to work on wall of solid rock from three different angles.

Bethlehem Bar Mats, delivered from warehouse direct to job, are unloaded from truck alongside newly graded strip of road.

F. W. Jordan (left), chief engineer for S. A. Scullen, Inc., confers with F. A. Murphy, assistant engineer.

Placing Bethlehem Bar Mat over initial course, as skip mixes new batch.

Conditions necessitated more than five miles of relocation recently on New York's much traveled Route 22, between Petersburg and North Petersburg. Construction of this new highway, part of which is shown in the accompanying pictures, was handled by S. A. Scullen, Inc., Waterford, N. Y. Bar mats for approximately 76,000 sq yd of pavement were among the steel items supplied by Bethlehem.

BETHLEHEM STEEL COMPANY, BETHLEHEM, PA.

On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation

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WINCHES

A Complete Line of Builders' Derricks and Winches—nationally known for dependable service and long life.

Write for Catalog or send your problems to our Engineering Department

The Sasgen line is handled by leading equipment distributors everywhere.

SASGEN DERRICK COMPANY
3101-27 W. Grand Avenue, Chicago 22, Ill.

C. & E. M. Photos

Using a truck-mounted Sullivan compressor and Sullivan jackhammers (photo above) this St. Charles County crew prepares to blast out some rock for use in ditch checks. In the other photo, District Foreman Herman Bergsiecker (right) inspects with one of his men a stockpile of concrete pipe made by county crews for culvert work and drainage.

spent its $125,000 yearly maintenance budget wisely, one of these big trucks can go anywhere on the county road system, in just about all kinds of weather.

Administrative-Financial Set-Up

Maintenance funds for the county average about $125,000 per annum, though in 1947 about $140,000 was available. This money is raised by a road tax assessment of 35 cents per $100 of assessed valuation, aided by a yearly sum of about $19,000 apportioned to the county from state highway funds through the recently enacted King bill.

The county court is responsible for disbursement of this money, and in most major matters it takes an active part. County Highway Engineer Rapp is the executive head of the Road Department, and his recommendations are followed seriously by the court.

A county maintenance force of 38 men is geared to maintain the roads at low cost with steady employment. By striking a fine balance between steady employment and good personal production by all the men, Rapp has justified his maintenance outlay to friends and skeptics alike.

Working out of O'Fallon is a 7-man bridge gang, whose job it is to re-deck many of the old timber floors with Class A reinforced-concrete slabs and to construct all other necessary drainage structures. Their duties take them all over the county, and they work throughout the winter except in bad weather.

The remainder of routine road maintenance is divided between what is known as the eastern and western districts. The eastern district foreman, down in the river-delta bottomlands, uses a crew of 11 men. His equipment consists of 2 motor graders, 2 pick-up trucks, a Caterpillar D4 tractor with a Traxcavator front-end loader, an International ID-6 with a Hough front-end loader, and 5 dump trucks. This crew works out of St. Charles.

The western district, slightly larger, has 14 men and a maintenance foreman. Two Caterpillar D2's with front-end loaders see service there. The district also has 5 dump trucks, with 3 motor graders and 2 pick-up trucks. This district has plenty of gravel deposits in the near-by creeks, so the county's Cedarapids rock-crushing plant ordinarily is assigned to the western crew.

St. Charles County also uses a 20-ton low-bed trailer and a Ford truck to move heavy equipment over the county. A 265-cfm Sullivan air compressor, mounted on a truck, is also used on a county-wide basis.

All men are hired on a yearly salary under a merit-system plan, and so long as a man's work is satisfactory he keeps busy during most of the year. Purchases of heavy equipment are made by the county court. Small items or materials are handled directly by the County Highway Engineer, who then passes the invoices through the court for payment. Rapp's administrative assistant is Erwin Griewing, Assistant County Engineer. Griewing has a desk in Rapp's office in the courthouse at St. Charles. He helps Rapp with surveys, and acts as a coordinator of road maintenance work.

Bituminous Maintenance

Most of the bituminous roads in the county were built by county maintenance forces on the old gravel bases. Construction followed a pattern. First,

(Continued on next page)

PMCO
America's Largest Builder of Material Handling Buckets
All Purpose
SHOVEL
PULL SHOVEL
DRAGLINE
CLAMSHELL
FRONTS, BOTTOMS, SCOOPS and TEETH shown in color on buckets are 14% manganese steel developing tensile strength up to 120,000 p.s.i. This high percentage manganese steel gives tough, rugged strength for hard service and allows wide set corner teeth for easy entrance in digging. Volume production methods enable us to build a better bucket with amazing economies in manufacturing.
Experience Counts. See your shovel man or equipment dealer about PMCO Buckets and Dippers.
DRAGLINE
Perforated Sizes ⅜ yd. to 2 yds. 20%-40% lighter than other makes.
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Mine Stripping Sizes 2 yds. to 9 yds
PULL SHOVEL
Outside Cutter Widths: 21", 26", 31", 36", 39"
On the ½ yd. and ¾ yd. Shovel, Pull Shovel, and Dragline Buckets, all teeth are interchangeable—a great advantage to operators.
CLAMSHELL
Sizes ⅜, ½, ⅝, ¾, 1 yd.
SHOVEL
Sizes ⅜ yd. to 18 yds.
"Quality Since 1880"
PETTIBONE MULLIKEN CORP. CHICAGO 51, U. S. A.
WE OPERATE THE LARGEST AND MOST COMPLETE MANGANESE STEEL FOUNDRY IN THE UNITED STATES

Class-Three County: Class-One Highways

(*Continued from preceding page*)

the gravel or rock base was re-shaped to its original 4-inch crown, and bladed several times to a smooth surface. Hot SC-2 asphalt then came in, in pressure distributors owned by St. Louis asphalt companies. A surface covering of 0.5 gallon of this material was applied in a 0.3 and a 0.2-gallon shot.

Left uncovered, this asphalt cured for about two weeks, on the average, before an application of 0.3 gallon per square yard of MC-4 or MC-5 seal coat went down. The County operates a Burch aggregate spreader, and this machine has been used extensively to spread truckloads of fine ⅛-inch torpedo gravel chips over the hot MC asphalt. About 20 pounds of chips per square yard has been customary. After the chips were laid, they were broomed and rolled, leaving a reasonably watertight, smooth, easy-riding surface.

St. Charles County bituminous roads, however, will not always stay that way. In the winter, frost attacks the ground. Heavy rains wet the subgrades on both sides of the asphalt surfacing. Truck traffic breaks down the sides of the topping. Potholes develop, and unless they get prompt attention, they get bigger.

To meet the growing demand for bituminous maintenance, St. Charles County now pre-mixes its own patch material with motor graders, and stockpiles it in windrows until it is all used up. The pre-mix is made up by adding 18 to 20 gallons of MC-3 asphalt per ton of aggregate, road-mixing it with motor-grader blades until the asphalt is thoroughly and evenly distributed, and then windrowing the material along a road shoulder or wherever the pre-mix was made.

The material is then loaded from the windrow by a tractor-mounted front-end loader, and the maintenance men put it in place. Potholes are broomed clean before the mix is applied, but the men find that no painting is required.

Bituminous costs in the county have jumped in the last eight years, due chiefly to the higher cost of asphalt. According to the County Engineer, a gallon of asphalt in place on the roads now costs 19 cents, compared to 12 cents eight years ago. In many cases, too, the adhesive quality of asphalt has dropped considerably, he says.

Shoving, or corrugation of the bituminous surface, is also a source of failure. This generally occurs only where the gravel sub-base is especially weak, over bad subgrades. The best remedy for a place of this kind is to rip the surface, shove the top material aside with a motor grader, and then dig out all the objectionable material. The hole is then backfilled with high-grade granular sand or gravel, and the bituminous mat is re-laid.

Bituminous roads are an excellent tool for public relations. When a community gets a bituminous road, it is looked on with envy by other people who still have to live on gravel highways. More and more bituminous work is added each year, within limits of the small budget, and the maintenance men don't forget these roads once they're built.

Maintenance of Gravel Roads

Maintenance of gravel roads follows the general pattern laid down a few years ago by the Missouri State Highway Department. A typical gravel or crushed-rock road in St. Charles County will soon develop one set of automobile tracks, and as traffic wears on the surface of the road, larger rock particles ravel out and whip off to one side of the road.

The purpose of maintenance is to bring these particles back to the center of the road, and to mix them with enough fine particles to hold them down.

Obviously this cannot be done to very good purpose in dry summer weather, because the fines will then simply blow away as dust. It has to be done shortly after a rain, while the ground in the ditches is still damp and friable. A motor grader pulls a very small amount of fine material up out of the side ditches, just enough to tie the bigger particles down. It usually makes two passes, one on each side of the road. If the resulting windrow in the center of the highway is big enough to be dangerous to traffic, the moter grader makes another pass down the center to level this material.

Traffic soon kneads the freshly graded surface down, and binds the big rock in. The effect is precisely the same as new construction work on granular sub-bases, where water is mixed in and pneumatic rollers compact the material. Many of the gravel roads in St. Charles County, especially where alignment is good, are 50-mph highways.

Auxiliary Work

Fortunately or unfortunately, roadside ditches in the county have a habit of filling with fine soil during any heavy rain. Throughout the late autumn, winter, and early spring months, roadside ditches practically fill up. In the spring, this excess material has to be removed. If the amount of fines is about right to add to the roadway surface, it is disposed of in that way by motor graders.

On bituminous roads, however—and on gravel roads where the volume of

(*Concluded on next page*)

The Lighthouse of the Highway
EMBURY
Traffic Gard
The Warning Lantern with the SAFETY BEAM
Order through Your Jobber
EMBURY MFG. CO., WARSAW, N. Y.

Here's good news for operators hauling heavy loads of milk, petroleum, machinery . . . logs and lumber . . . stone and ore . . . furniture and freight. Substantial production of GMC 720 series Specialized Tractors and 800 series straight truck models, assures quick delivery.

GMC 720 series tractors have gross combination weight ratings of 40,000 pounds . . . the 800 series trucks have gross vehicle weight ratings of 30,000 pounds. Both are offered in wheelbases of 136 to 196 inches, with cab-axle dimensions of 60 to 120 inches. Both have big 426 cu. in. engines of the same basic design as the war famous "Army Workhorse." Both have many other features specific to the jobs for which they are built.

If you need a new truck in either classification, put your money on one of these all-truck, heavy duty GMCs.

GMC TRUCK & COACH DIVISION • GENERAL MOTORS CORPORATION

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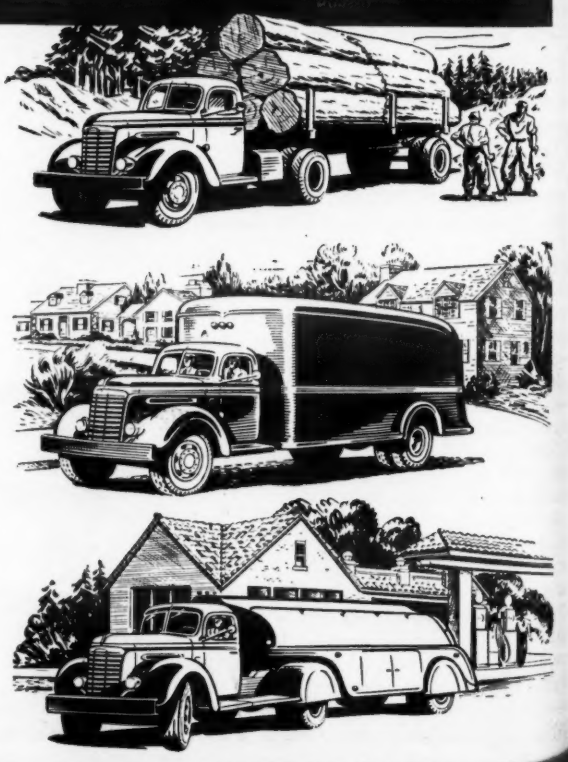
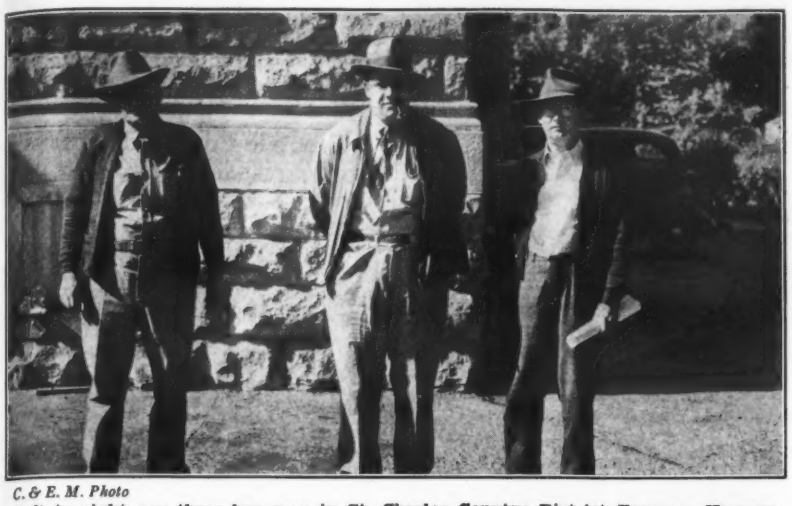




C. & E. M. Photo
Left to right are three key men in St. Charles County: District Foreman Herman Bergsiecker, Engineer and Surveyor Edgar Rapp, Jr., and his assistant Erwin Griewing.

this kind of material is great—the excess soil must be hauled away. Motor graders pull it up on the road and leave it windrowed. The material then is scooped up by the front-end loaders and hauled away by dump trucks.

In an effort to stop this sort of maintenance, and to save the valuable soil of this nation, St. Charles County is taking a leaf from the U. S. Department of Agriculture notebook and lately has begun the construction of small ditch checks. Built with rock riprap stone, at any odd moment when no other work is in progress, these small checks stop the velocity of water and cause the rainwater to flow away in as clear a form as possible. It has been noticed that ditch maintenance costs are somewhat lower where checks have been built. Destructive erosion by fast-moving run-off water does not occur at those places.

Another serious right-of-way problem on roadsides is the heavy growths of brush, which choke ditches, reduce sight distances around curves, and detract from the appearance of rural county highways. Two Case mowers and a John Deere machine work all summer long on roadside work. Preliminary tests now are also under way with some of the weed-killing chemicals made by Ralston Purina Co.

Bridge rebuilding and maintenance is a year-round job, since the county has many streams. Most of the bridge structures are old and narrow, and the old timber floors are now giving way. So county forces are changing many of the bridge decks to concrete, as rapidly as possible. There have also been some instances of widening and structural work. One of the high points of bridge-building efficiency was reached in 1941 on an emergency job, after floodwaters had ruined one of the best bridges in the county.

Rapp designed a structure to replace the old one in the field. It was built in about two months and the 110-foot span when completed cost only $7,700.

Last winter was one of the worst on record for snow, ice, and frost damage. Old-timers hearkened back to the cold winters of the 1890's. But St. Charles County is likely to get snow any year from December through February. Four truck-mounted push plows and a motor-grader-mounted V-plow take care of the snow when it comes, tending to it as it falls, rather than waiting to open blocked highways.

Equipment Maintenance

The County's 32 major pieces of equipment come in for regular service and repair. They include 15 trucks, 5 maintainers, 3 mowers, 4 front-end loaders, a small asphalt distributor, a rock speader, 2 Cedarapids crushers, a tractor, and pull grader. One mechanic in the St. Charles headquarters shop takes care of all equipment, with the help of the operators.

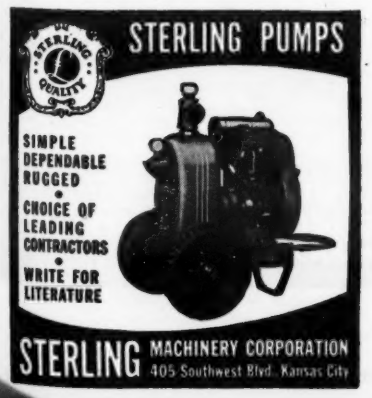
Equipment upkeep is based on the replacement of parts only. If extensive machine-shop jobs are needed, they are done in St. Louis on purchase orders. The County maintains no facilities of this kind because it has come to believe they are too expensive. The machines are repaired in the field, if the job is not large. Otherwise, they come in to the St. Charles yard on the low-bed trailer.

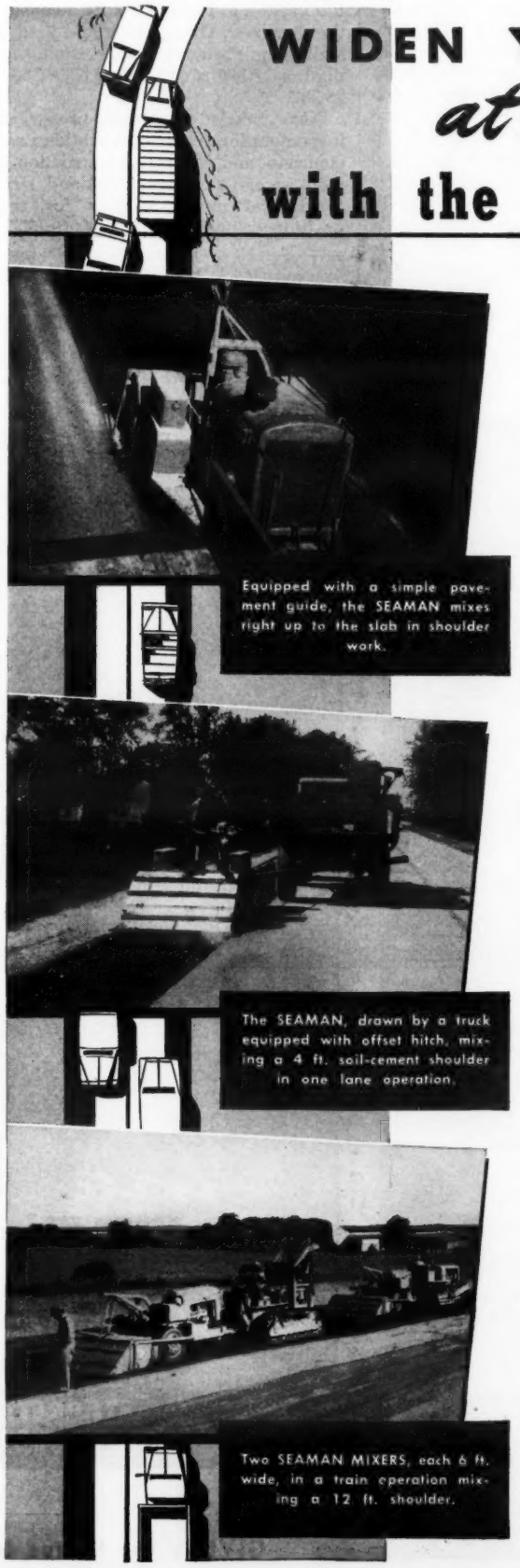
The headquarters shed is a corrugated-tin structure 50 x 125 feet. When the shed is not otherwise in use as a repair shop, equipment is stored there.

The rock crushers are ordinarily set up the year round, with a concentration of production through the winter months when other maintenance work is caught up. Stockpiles of crushed rock are then hauled out to the roads when spring comes. Last year the county crushers produced 9,490 tons of crushed rock. Most of the gravel was purchased from local pits at a royalty rate of from 5 to 10 cents per cubic yard.

Ever present is the number one problem of all: the low road budget. Rapp believes that this may take care of itself in time through better public consciousness of highway needs and the high cost of construction. But until that time comes, and not even then if Rapp still has anything to say about it, the County can't afford to waste any of its road-building money.

Edgar Rapp sums it up very neatly when he suggests, "The more of a county engineer's budget he can put out on his roads, the fewer taxpayers will come complaining into the office".




Equipped with a simple pavement guide, the SEAMAN mixes right up to the slab in shoulder work.
The SEAMAN, drawn by a truck equipped with offset hitch, mixing a 4 ft. soil-cement shoulder in one lane operation.
Two SEAMAN MIXERS, each 6 ft. wide, in a train operation mixing a 12 ft. shoulder.

WIDEN YOUR HIGHWAYS *at minimum cost* with the SEAMAN MIXER

Greatly increased traffic has created a vital need for wider highways. Yet increased construction costs present a very serious problem . . . The answer is wide, well constructed, high load-bearing all-weather shoulders, — shoulders that can stand up under the impact of heavy semi-trailers and provide a safe area for tire changes or repairs . . . Such shoulders are constructed today at surprisingly low cost — with the SEAMAN MIXER. Four, five, six or seven feet wide, — there's a model made to do the complete mixing job in one lane. And the SEAMAN mixes right up to the slab, — not even a fraction of an inch of unmixed material between . . . So whether shoulders are to be of bituminous construction, soil cement, clay gravel, stabilized turf, — in fact any type of binder mixed with aggregate or soil, — do the job with the SEAMAN . . . The SEAMAN MIXER represents a small initial investment starting as low as $1048, one-man control, economical operating and maintenance cost and extraordinarily high daily output . . . The SEAMAN MIXER takes advantage of the great economy of road-mix operation, yet through a unique engineering principle produces "plant mix quality at road mix cost".

For a graphic visualization of what actually happens within the mixing chamber of the SEAMAN, send today for the illustrated Bulletin—"Why A Seaman Mix Is A Superior Mix"—a scientific analysis of the SEAMAN'S highly controlled mixing action. Your request implies no obligation.

Here's the Bulletin "Why A Seaman Mix Is A Superior Mix". Just off the press, it gives for the first time "X-ray" views of the forces and flow of materials inside the SEAMAN MIXER. Send for your copy now.

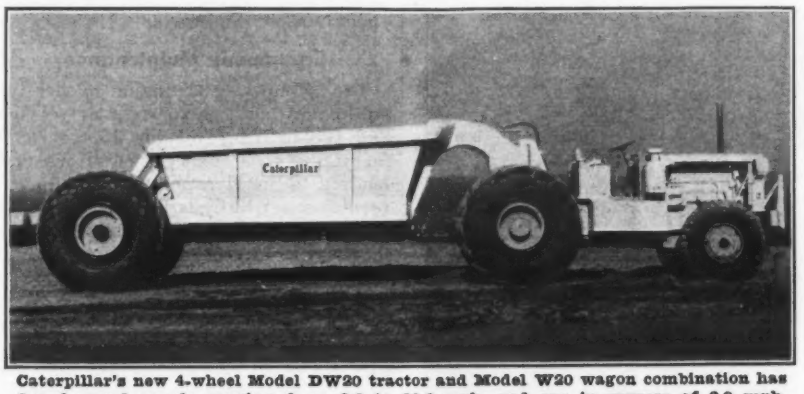
SEAMAN MOTORS, INC.
MILWAUKEE 3, WISCONSIN

Earth-Moving Units Shown for First Time

Several high-speed rubber-tired earth-moving combinations have been put into production at the Peoria,, Ill., plant of the Caterpillar Tractor Co. Included in the line-up—which was introduced at the Road Show—are the diesel-powered 2-wheel Model DW21 tractor with its design-matched Model No. 21 cable-operated scraper, and the 4-wheel Model DW20 tractor with the Model W20 wagon. Power for both tractors is obtained from another new Caterpillar product, a 225-hp diesel engine.

Both tractors have constant-mesh helical-gear pump-lubricated transmissions; foot-operated 16-inch-diameter double-plate clutches with semi-metallic friction surfaces; and full-floating 4½-inch-diameter rear wheels. The 2-wheel Model DW21 has five forward speeds ranging from 2.6 to 20.6 mph, and one in reverse of 2.9 mph. The Model DW20 has five forward speeds ranging from 3.26 to 26.0 mph, and one in reverse of 3.6 mph.

The DW21 tractor and the Model No. 21 scraper combination has an overall length of 39 feet 7 inches, a width of 11 feet 6 inches, a height of 10 feet 8 inches, and a wheelbase of 24 feet. The wheel tread is 84 inches, and the 24-ply 24:00 x 29 tires are interchangeable between tractor and scraper. The scraper has a struck capacity of 14.5 cubic yards and a heaped capacity of 18½ cubic yards. According to the manufacturer, it will make a 9-foot 6-inch cut. The air-operated foot-controlled brakes have a provision for applying the tractor driving-wheel brakes individually. Positive hydraulic follow-up-type steering, 90 degrees each way, is another feature



Caterpillar's new 4-wheel Model DW20 tractor and Model W20 wagon combination has five forward speeds ranging from 2.6 to 20.6 mph, and one in reverse of 2.9 mph. The bottom-dump wagon has a struck capacity of 14 cubic yards and 22 heaped.

claimed for the unit. The manufacturer also explains that a non-stop turn can be effected in 35 feet. Shipping weight of the combination is 47,220 pounds.

The 4-wheel Model DW20 prime mover has a 127-inch wheelbase, a front-wheel tread of 88 inches, and a rear-wheel tread of 84 inches. Overall length of the DW20 prime mover and the Model W20 wagon combination is 42 feet, the width is 10 feet 8 inches, and the height is 8 feet 8 inches. The bottom-dump wagon has a struck capacity of 14 cubic yards and a heaped capacity of 22 cubic yards. It has a 14-foot 2-inch hopper, and a door which is 8 feet wide at the rear and 8 feet 4 inches wide in front. The door opening is 11 feet 6 inches x 5 feet 4 inches. Clearance is 32 inches with the door closed and 10 inches with the door open. The door is hydraulically controlled, and is provided with a mechanical lock. Front tires for the tractor are 20-ply 14:00 x 24; the rear tires—interchangeable with the drive wheels and the wagon wheels —are 24-ply 24:00 x 29, with a tread of 8 feet 6 inches.

Further information may be secured from the company, or by using the enclosed Request Card. Circle No. 120.

Engineers Needed in West

The Portland District, Corps of Engineers, has announced a call for engineers. Professional engineers qualified for grades P-1 and P-4 are needed in the Portland, Oreg., office and field installations under its supervision. Annual salaries range from $2,947.80 to $5,232.

Also needed are sub-professional inspectors for dredging operations, soils, concrete and general construction, as well as civil, cartographic, and structural draftsmen. Salaries for these positions range from $2,974.80 to $3,351. Qualified personnel are requested to contact the District Engineer, Corps of Engineers, 628 Pittock Block, Portland 5, Oreg.

Electric-Powered Hoists

Detailed information on the Bob-Cat line of electrically-powered cable hoists is contained in a folder issued by the Lisbon Hoist & Crane Co., Division of Wright File Co., Lisbon, Ohio. This folder features a description of recently introduced models in the 3 and 5-ton-capacity ranges.

Among the features pointed out in the catalog are light weight, small size, accessibility, and strength. A 2-page spread shows a cross-sectional view of the hoist and its construction. Accompanying this spread are views showing the three principal components of the complete hoist—the gear train, the motor and cable drum, and the solenoid brake. The folder also lists specifications and prices for all models in the Lisbon line of Bob-Cat hoists, and mechanical and electrical extras.

Copies of this literature may be obtained from the company. Or use the enclosed Request Card. Circle No. 25.

Pioneer Names Belanger

A. J. (Joe) Belanger is named Bituminous Equipment Sales Engineer by the Pioneer Engineering Works of Minneapolis, Minn. Mr. Belanger will serve as a specialist on sales in the United States and Canada.

Altimeters
for all preliminary surveys
How much money will this instrument save YOU? Preliminary surveys in 1/10th the time with accuracy better than 1 part in 1000.
Type SA-1: Range 4360' (-760' to + 3,600') in intervals of 2'
Type SA-2: Range 10600' (-900' to + 9,700') in intervals of 5'
Type SA-3: Range 15000' (-500' to + 14,500') in intervals of 10'
All models priced $200 complete with case, hand & shoulder straps, magnifier and thermometer. IMMEDIATE DELIVERY —see your dealer or write direct for descriptive folder.
AMERICAN PAULIN SYSTEM
Manufacturers of Precision Instruments
Altimeters

Cutting
WIRE ROPE
is easy
FAST Specially designed cutting blade and dies assures fast cutting action. The hammer principle eliminates any special skill requirements.
CLEAN Wire rope ends are cut smooth and clean for perfect threading or splicing.
SAFE The enclosed cutting blade locked in the body of the cutter assures perfect safety.
PORTABLE Models for tool kit or stationary operation. With cutting capacities up to: 1 inch, 1 1/16 inch, 1 1/2 inch.
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SEE YOUR DEALER OR WRITE DEPT. "B"
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GIVE to the United Nations Appeal for Children

Road Show Displays New Highway Machines

Attendance High at Large Exhibit of Record Number Of Equipment Models; Field Work Shown at Airport

✦ THE 39th Road Show of the American Road Builders' Association, at Soldier Field, Chicago, in July, broke all previous records for size, attendance, number of pieces of construction equipment on display, and general interest. The 9-day display drew visitors from all parts of the globe to view the most complete collection of road-building machinery ever before assembled in one place. Every important manufacturer who contributes to highway construction with his products was represented. Many models never seen anywhere before made their bow at the Show, which for the first time was held outdoors.

Spread over 30 acres surrounding the big stadium on the shores of Lake Michigan, the Show had room to stretch in. As one manufacturer expressed it, looking over the big expanse, "Never again will a Road Show be held indoors". Big shovels maneuvered around and went through all the motions of digging, while huge rubber-tired dozers and self-propelled earth-movers in their display enclosures snorted like well trained animals.

The last previous show was held in 1940, also in Chicago, but indoors at the International Amphitheatre. During the war years the Show was omitted, but not long after the firing ceased, the ARBA began to think about holding a big post-war show and laid plans accordingly. The plans culminated in the mammoth world's fair of construction equipment from July 16 to 24, where some 300 exhibitors displayed over 5,000 pieces of construction equipment and materials used in the ever-growing road-building industry.

In conjunction with the show, twelve concerns with the necessary machines built a parking area at the Chicago Northerly Island Airport. The airport lies just across a lagoon from Soldier Field at the end of a peninsula sticking out into Lake Michigan south of the Planetarium. Buses in a constant stream brought delegates and visitors to and from the job site. While the heavy equipment, roaring and throwing up dust, stabilized the soil with portland cement, the onlookers were given a detailed description of the work over loud-speakers. This was possibly the first time that the average layman ever was given a step-by-step account of the workings of an active construction job.

Also in conjunction with the show, the 45th Annual Convention of the ARBA, was held at the Stevens Hotel. But more about that later.

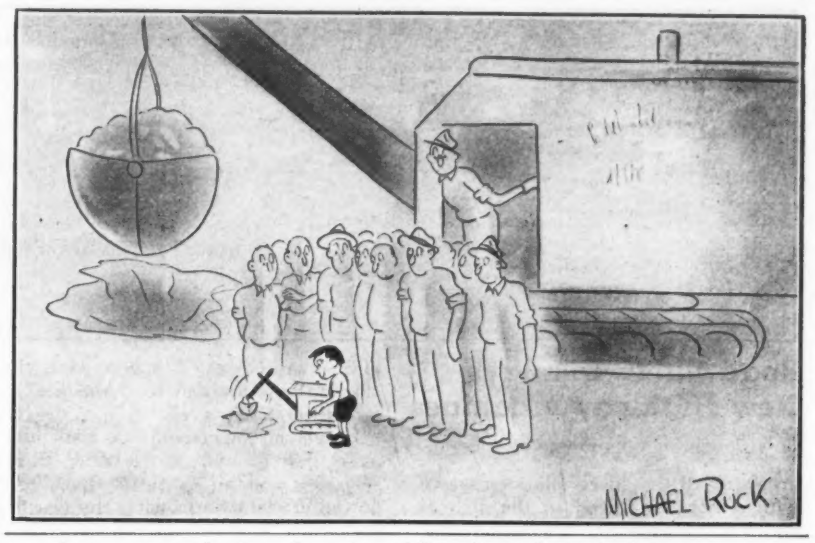
Weather Holds Good

Even the weather seemed made to order for the road builders' show. While the nine days were warm, they were not unduly hot, and a breeze was usually in evidence along the lake shore. The various exhibitors vied with each other in displaying their machines to the best advantage, and the huge north and south concourses were ablaze with gaily colored flags and bunting, to say nothing of the brightly painted machinery. Many concerns passed out large envelope folders that the visitors promptly filled with literature describing in detail the equipment on display. Easy chairs were available at nearly every exhibit for the sightseer's convenience while he viewed the models, looked at motion pictures of the equipment in action on small-sized screens, or just plain rested.

If his eyes became tired from the light and color, he roamed through the endless maze of passageways under the stadium which were lined with the booths of exhibitors. These were on two levels—ground and mezzanine—with the upper floor featuring chiefly educational and scientific exhibits.

Every day, beginning at 10:30 a.m., there was a band concert accompanied by speeches at the Road Show pavilion outside the stadium. But after that and until 7 p.m., the closing hour, the visitor just looked and walked.

One was bound to get a touch of Road Show feet from all the walking. The Insley Shovel people thoughtfully provided sturdy wooden canes as a "give-away", and this souvenir was probably the most popular gift of the show. Other tokens that were well received included sun glasses, corn-cob pipes, key rings, bottle openers, maps, lighter fluids, and book matches in quantities sufficient to take care of smokers' needs for a number of months in the future.



Visitors were provided with a Directory of Exhibits that contained dia-

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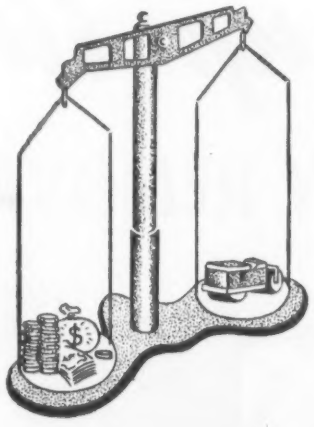

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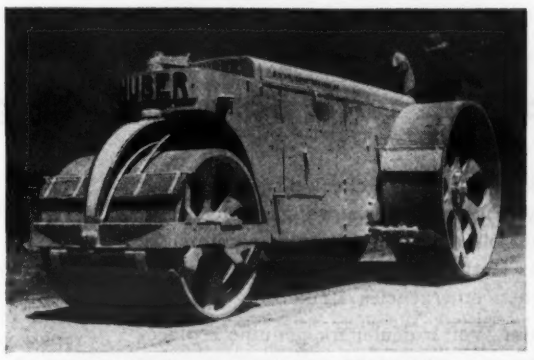
IS IN YOUR FAVOR
WITH MODERN
HUBER
ROAD MACHINERY

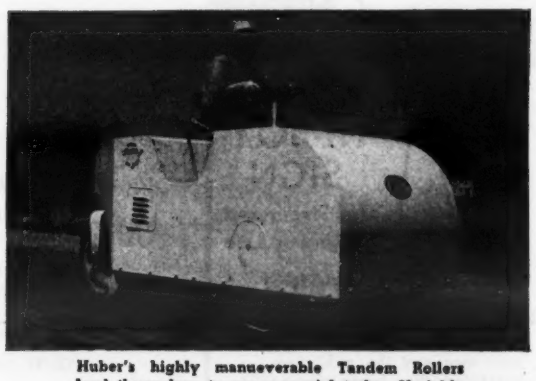
Huber's versatile Road Maintainer—a lift loader, berm leveler, bulldozer, patch roller, snow plow, or rotary broom all in one

Today's conditions demand that your operation's budget balance out. Modern Huber road machinery will help you do better than that—the efficient, result-producing Huber line will actually tip the balance in your favor.

Road men, from maintenance crews to new road contractors recognize the "extras" that are built into every piece of Huber equipment. Plenty of power . . . economical operation . . . dependable performance . and the ability to do any job are Huber traits that point to more profitable road operations for you. Write today for bulletins on the Huber equipment that will best serve you.



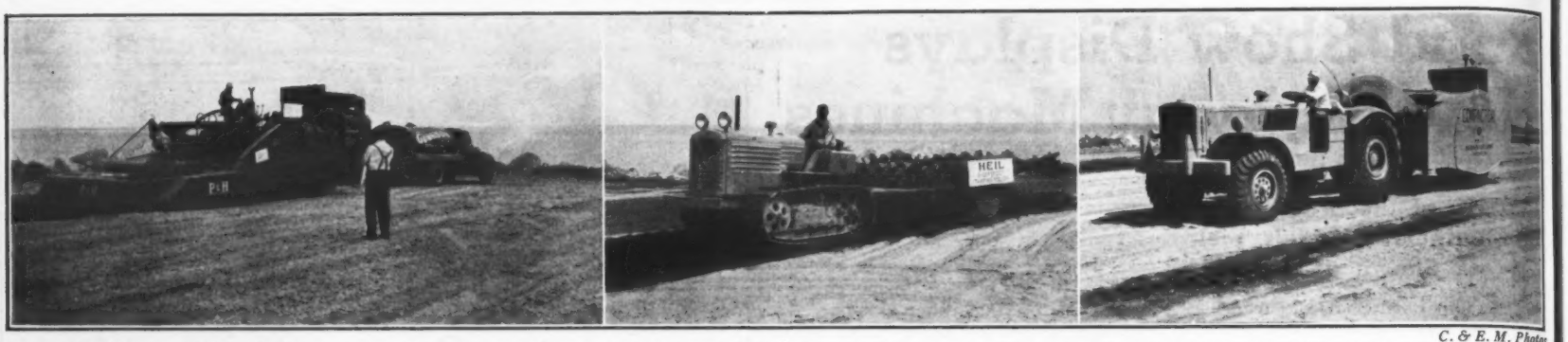
Huber's always dependable 3-Wheel Rollers—built in sizes, from 5 to 12 tons, suited to any rolling operation.



Huber's highly manueverable Tandem Rollers lend themselves to many special tasks. Variable weight models from 3 to 14 tons.

THE HUBER MFG. COMPANY • MARION, OHIO, U. S. A.

HUBER
3 Wheel • Tandem
ROAD ROLLERS and MAINTAINERS



C. & E. M. Photos

One practical aspect of the 1948 Road Show was this demonstration of a soil-cement stabilization job on a parking area at the Chicago Northerly Island Airport. In the first photo, a P&H Single-Pass Stabilizer takes on water from a Gunnison 1,600-gallon tank mounted on a Ford truck. In the second, an Oliver-Cletrac tractor pulls a Heil sheepsfoot roller over the strip for initial compaction. In the third, a Cedarapids Model 60 Compactor pulled by a Caterpillar DW10 handles depth processing.

Road Show Displays New Highway Machines

(*Continued from preceding page*)

grams of all the space allotments, each with a number keyed to the aisle on which it was located. None of the displays showed this assigned number, however, which often made it difficult to find the exhibit desired. The only really blue note injected into the show came in the form of complaints about the eating facilities. After walking for miles in the open air, show-goers usually developed ravenous appetites which were far from satisfied with hot dogs, hamburgers, and luke-warm soda pop or ice-cream sticks—the only edibles provided within the show grounds.

Equipment at Work

One of the most practical aspects of the 1948 Road Show was the field demonstration of modern equipment at work on a soil-cement stabilization job. Under the cooperative sponsorship of the manufacturers whose machines were represented, and the Soil-Cement Division of the Portland Cement Association, the project was presented free to the City of Chicago.

The job consisted of improving an 18,000-square-yard plane-parking area near the Northerly Island Airport. Over a period of years, the site had grown from a swamp along the shores of Lake Michigan to a soft fill, and was then surfaced with about 4 inches of crushed rock. Arrangements as made with the City called for salvaging this crushed rock, stabilizing the top 6 inches of soil with 10 per cent of portland cement, and then working the crushed rock back over the area.

Because of the size of the job, only 3-hour demonstrations were given each day, in the afternoon. Equipment was also operated at a speed somewhat slower than normal, to make the job last through the week.

Universal bag cement was distributed over the ground by a new Smith spreader, with an Austin-Western 99-H power grader windrowing the crushed rock away from this operation. Usually only one 10-foot strip was done each day.

The entire operation of pulverizing the soil, blending soil and cement, adding water, and mixing was handled by a new P&H Stabilizer. Mixing water was added through the P&H machine from a water tank of 1,600-gallon capacity, made by Gunnison Mfg. Co. of Baraboo, Wis., and mounted on a Ford truck. The P&H Stabilizer mixed the material thoroughly in a single pass, and left it smooth and well pulverized, ready for the rollers.

For initial compaction, a double-drum

(*Concluded on next page*)

THE "SIGN" OF SAFETY!

HI-BOY SIGN
for Street and Highway Use

ALL METAL-NON-TILTING, HIGH VISIBILITY FOR STREET AND HIGHWAY USE

Will not blow over, leaving your men and the public unprotected. Sign frame pivoted on each side allowing movement with varying wind pressures and full vision at all times.

Attractively and rigidly constructed; folds compactly for storing.

Complete Information on New Bulletin D-98

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INDUSTRIAL PRODUCTS COMPANY
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Check-up Time

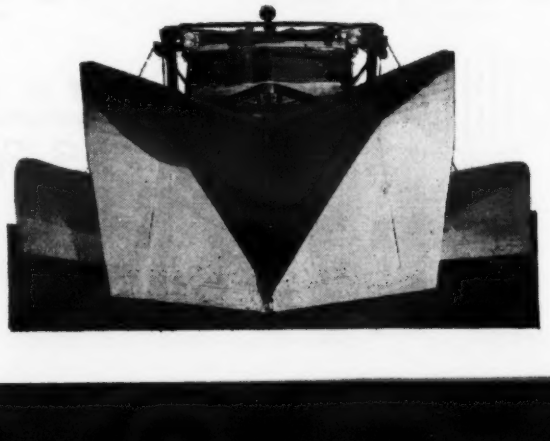
FOR SNOW REMOVAL EQUIPMENT!

Walter dealers and factory service men ready to help with parts, servicing and recommendations

NOW is the time for checking your Walter Snow Fighters, plows, wings, blades, hydraulic controls and other winter maintenance equipment. Getting everything ship-shape will pay off when emergencies strike.

Rely on your Walter dealer for genuine replacement parts and competent servicing of your Walter Snow Fighters. The assistance of our factory-trained service men is also available, without obligation.

Your Walter Snow Fighters are designed and built to stand up under severe conditions. Give them regular and sensible care and they will repay you with many, many years of faithful service.



WALTER MOTOR TRUCK COMPANY
1001-19 IRVING AVENUE, RIDGEWOOD 27, QUEENS, L. I., N. Y.

If you need new equipment
ACT NOW!
● Call your Walter dealer to discuss your needs. Or write us for literature. Time is short, don't delay.

WALTER SNOW FIGHTERS

Heil sheepsfoot roller was pulled over the strip by an Oliver-Cletrac Model B tractor. The strip was then ready for depth processing to add compaction deep down in the fill. A new Cedarapids Model 60 Compactor, pulled by a Caterpillar DW10 machine, performed this job. Heavily ballasted, the big machine moved along on smooth rubber tires and vibrated the soil about 1,000 cycles per minute.

Compaction planes were then removed by a small Case Model SI industrial rubber-tired tractor, pulling a spike-tooth harrow. A Case tractor with a Bros Wobble Wheel pneumatic roller then moved in to give the material its final compaction.

Final shaping was done by the Austin-Western power grader, and final rolling or dressing was done by a smooth-wheel Galion variable-weight tandem machine. Excellent densities were obtained, averaging 121 pounds per cubic foot, or about 99 per cent of optimum density. Results were constantly checked by laboratory technicians from the Portland Cement Association.

Miles Catton represented PCA on the job, and R. P. Jones of Harnischfeger Corp. directed field operations.

45th Annual Convention

While the show was in progress at Soldier Field, the 45th Annual Convention of the American Road Builders' Association was being held at the Stevens Hotel, the convention headquarters. During the five days from Monday, July 19, through Friday, July 23, over thirty committees representing all phases of highway and airport design, construction, and maintenance made reports covering their respective activities. Despite the glittering attractions of the big machines on the exhibit concourses, the meetings were fairly well attended.

Important Topics Discussed

The growth of the road-building business and the modernization of the Road Show were the themes of an address by J. T. Callaway, President of ARBA, who told his audience, "Today we witness the breaking of precedent in road shows. Today you are witnessing a construction-machinery exhibit over six times as large as the biggest short-term industrial exhibit ever held anywhere in the world".

How the Congress looks at highways was the subject of addresses by Senator Dennis Chavez of New Mexico, and by Congressman Paul Cunningham of Iowa. Under the leadership of President A. Diefendorf of the ARBA's Educational Division, a series of meetings was held to broaden the educational policy of ARBA in engineering schools.

Honorable Thomas H. MacDonald, Commissioner of the Public Roads Administration, Washington, D. C., gave a lecture on highway development, administration, and finance. His talk traced the growth of the highway network, and the evolution of governmental financing over America's present vast highway network.

Earth-moving with scrapers, bulldozers, and graders was discussed in lectures prepared by equipment experts of the Manufacturer's Division of ARBA.

The entire program of meetings was designed to advance the road-building art not only in the United States, but all over the world. For example, at a technical session for international guests, the design of foundations, drainage, and pavements came in for discussion. Other subjects for international guests were construction and maintenance of highways, aggregate preparation and concrete handling, soils and stabilization methods, and equipment.

In general, the meetings emphasized the fact that a hard job lies ahead. With some 90,000 miles of highways now rapidly deteriorating, the job to be done is as large as it is difficult. One speaker urged contractors to finish the work as rapidly as possible, to justify future allocations of funds for Federal Aid.

Time alone can tell how the road-building job will work out, but delegates enthusiastically conceded that the 1948 Road Show hastened the development of new equipment and techniques as nothing else could have. So far as most delegates and visitors were concerned, the 1948 meeting *was* "biggest and best".

Fulton Bag Buys L. A. Plant

The Fulton Bag & Cotton Mills, bag, tarpaulin and canvas manufacturer, has purchased West Coast Bags, Inc., of Los Angeles, Calif. Main offices of the Fulton Co. are located in Atlanta, Ga., with factories presently operating in Atlanta, Minneapolis, New Orleans, St. Louis, Dallas, Kansas City (Kans.), and Denver.

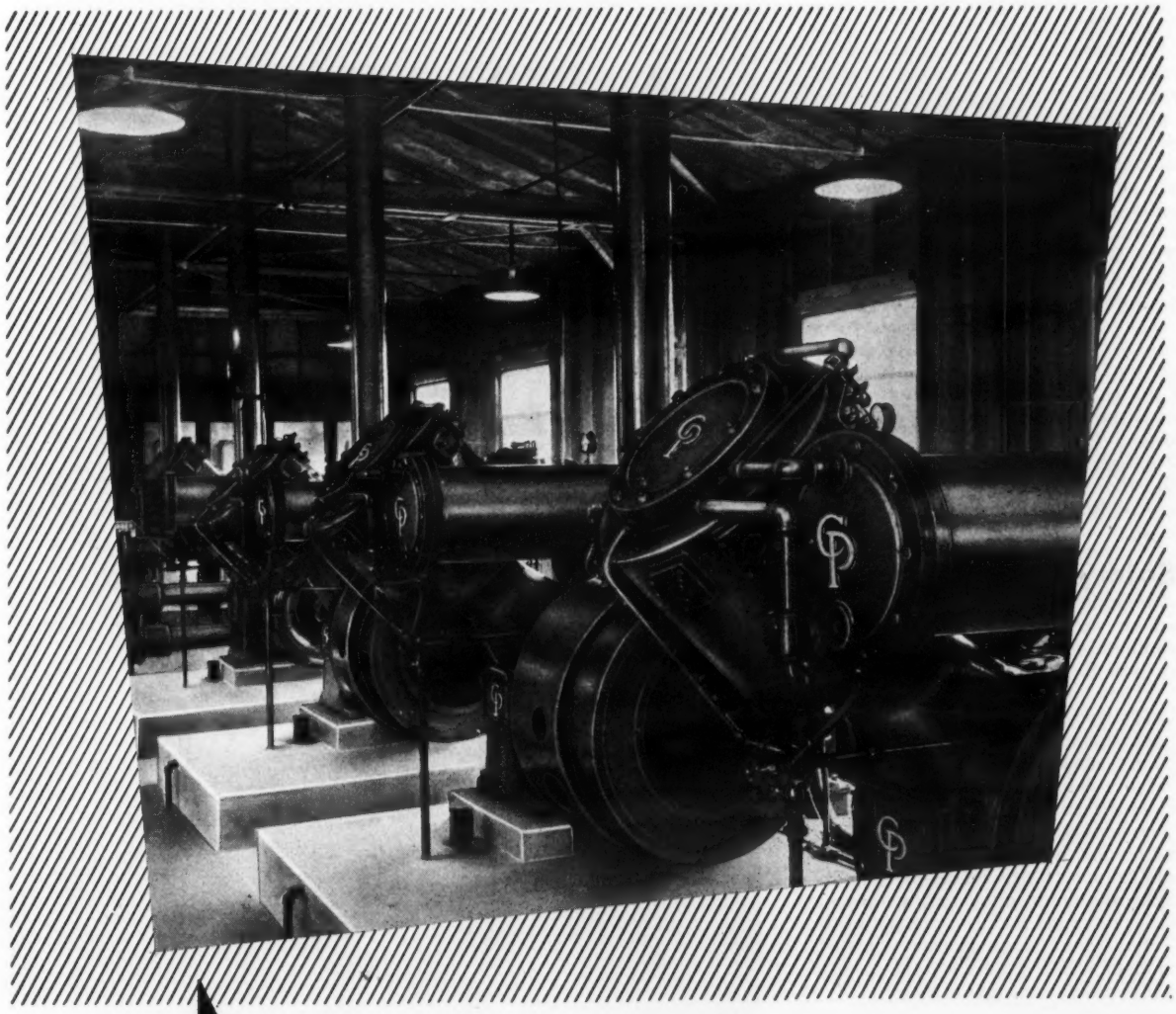
Jack C. Baldwin, who was President and Manager of West Coast Bags will continue as Manager of the Los Angeles plant, which will be maintained principally with its present personnel. Otis G. West is being transferred to the L. A. plant as an assistant to Mr. Baldwin. Present contracts of West Coast Bags will be executed by Fulton.

FLINK SPREADER

Unquestionably the finest hydraulic spreader.

Hundreds more transportation companies, cities and counties are using Flink Spreaders to spread granulars in ice control and highway maintenance work. Spreads forward or backing up, full or half width of street. Controlled from cab. Write for literature.

FLINK CO. Dept. S-5 **Streator, Ill.**



It's easy to install!

TYPE Y COMPRESSOR

Shipped intact as a "package unit," ready for external connections, a CP Type Y Compressor can be set up quickly with minimum expense. It needs only a simple foundation, and requires no special skill to align and install it. Its compact design renders it ideal where floor space is restricted.

It operates at high efficiency with low maintenance because of such features as large area Simplate valves . . . multi-step capacity regulation . . . effective inter-cooling . . . precision bearings . . . force-feed lubrication.

Available with built-in or direct-coupled motor, or with V-belt drive, in capacities of 500 to 900 c.f.m., at 80 to 125 pounds pressure. Sizes for other pressures also furnished. Write for full information.

CHICAGO PNEUMATIC TOOL COMPANY
General Offices: 8 East 44th Street, New York 17, N. Y.

PNEUMATIC TOOLS • AIR COMPRESSORS • ELECTRIC TOOLS • DIESEL ENGINES
ROCK DRILLS • HYDRAULIC TOOLS • VACUUM PUMPS • AVIATION ACCESSORIES

The Buckingham thread cleaner is made in two sizes to restore and recondition right or left-hand threads on bolts or studs up to 2 9/16 inches in diameter.

New Thread Cleaner

A thread-cleaning device is announced by Buckingham Mfg. Co., Inc., 7 Travis St., Binghamton, N. Y. This tool is designed to clean and restore flattened, distorted, or badly rusted right or left-hand threads of any size or pitch on bolts or studs. It is made in two sizes: the No. 6103 which can be used with bolts up to an inch in diameter; and the No. 6104 which will handle bolts up to 2 9/16 inches in diameter.

The Buckingham thread cleaner is slipped over the bolt and the cutting jaws are tightened into the threads. The threader is set and held to size by a single lock nut on the knurled handle. The unit is then turned until it comes off the bolt. The manufacturer recommends the use of a light oil during this process.

Further information may be secured from the company, or by using the enclosed Request Card. Circle No. 101.

Safety Jack Supports

Aluminum-alloy supports for jacks used on various construction jobs are manufactured by Templeton, Kenly & Co., 1020 S. Central Ave., Chicago 44, Ill. They are designed to replace wooden wedge supports. Their applications include holding jacks used to raise the deck of ballast-deck bridges, to replace defective bridge caps, to raise the cap off piling so that drift pins can be cut between piling and cap, to raise sand towers, etc.

The supports are made of a lightweight aluminum alloy and are scientifically designed for proper weight distribution, the manufacturer explains. The Model JS-1 weighs 8¾ pounds and has a platform measuring 7 x 10 inches. It is 15 inches in height.

Further information may be secured from the company, or by using the enclosed Request Card. Circle No. 76.

Gear-Motors Data

A 16-page illustrated catalog on its line of double and triple-reduction gear units with integrally mounted electric motors has been prepared by the Link-Belt Co., 307 N. Michigan Ave., Chicago 1, Ill. Catalog No. 1815 lists units in standard sizes ranging from 1 to 30 hp and with an output speed range of from 6 to 280 rpm.

Among the types of motors listed are open, totally enclosed, splash or explosion-proof ones, and types with special grades of insulation. Motor-operated brakes can also be furnished. Horsepower ratings listed in the booklet are calculated from the formula adopted by the American Gear Manufacturers' Association. The catalog tabulates the various sizes of gear motors available; gives their dimensions and average weights; shows styles of mountings; includes load-classification and selection tables; and gives dimensions of slide rails.

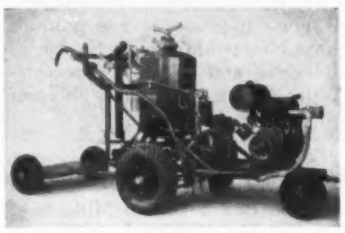
Copies of this literature may be obtained from the company. Or use the enclosed Request Card. Circle No. 95.

Catalog on Metal Wheels

A catalog listing its complete line of wheels has been put out by the Geneva Metal Wheel Co., 248 Railroad St., Geneva, Ohio. It describes the Geneva wheel with puncture-proof semi-pneumatic tires, the cast wheel with a molded-on solid rubber tire, pneumatic-type tires with separate tubes, and other items in the line.

A recently introduced unit which is also described is the FDC 300 wheel with full-drop center rim and a 4.00 x 8 (16-inch outside diameter) pneumatic tire and separate tube. It is made to Tire & Rim Association standards, and is equipped with high-capacity taper roller bearings with Security felt seals. Features claimed for it include the following: the tire can be demounted without removing the wheel from the axle; grease tubes are furnished between the disks to prevent grease from getting to the tire and to give added strength against side thrust; the wheel is held in alignment by taper dowels inserted in the disks so that they will match perfectly; and holes through the ferrule rivets promote ventilation and air circulation.

Copies of this literature may be obtained from the company. Or use the enclosed Request Card. Circle No. 31.



All-Purpose Striper Solves Zone-Marking Problem

Self-propelled and completely self-contained, designed to meet the needs of state and county highway departments, municipalities and airports for accurate high speed striping.

Clean-cut, attractive lines are assured with K-C Air Curtains. Air actuated traction up to 5 MPH with a trailer for the operator. Truck mounted and other models available for all requirements. Write for folder.

KELLY-CRESWELL CO., Xenia, Ohio

A SOLID BASE OF OPERATIONS

For Fast Dragline Service

Compact design, with weight properly distributed for a low center of gravity, gives the Bucyrus-Erie ⅜- to 2½-cu. yd. excavators their unusual stability . . . and provides the safe, sure working foundation you need for efficient, high-speed dragline operation. Long, widespread mountings and treads with large bearing areas are other factors giving the Bucyrus-Eries a sure-footedness ordinarily expected only from heavier machines. And there are other features, too, which combine to deliver high output with Bucyrus-Erie draglines—the positive, full-feel control and slow speed, smoothly responding clutches and brakes which give the operator secure command of the load throughout the cycle; the all-welded, latticed box section boom that resists swing and compression stresses, and the strong, balanced Red Arch buckets that fill easily, carry smoothly, dump cleanly. For long hours of sustained production that result in bigger profits, you can't beat a Bucyrus-Erie. Let your distributor show you more reasons why they are such outstanding performers. 93E47

BUCYRUS ERIE

BUCYRUS-ERIE COMPANY
SOUTH MILWAUKEE, WISCONSIN

General-Duty Grader

An all-purpose motor grader is manufactured by the American Road Equipment Co., 2319 N. 18th St., Omaha 10, Nebr. This unit, the American No. 6, is for grading work, ditching, and other uses. It can be equipped with a high-lift front-end loading unit, a scarifier, or a snow plow to extend its application.

The unit is powered by a 4-cylinder 31-hp gasoline engine. It has a 5-speed transmission and travels from 2.50 to 15.25 mph forward and 2.87 mph in reverse. The blade has a 12-inch clearance, a 12-inch manually operated side shift, a 5-inch penetration below ground level, and a throat clearance, from bottom of circle to cutting edge, of 23 inches. It will rotate through 120 degrees in either direction, and exerts a pressure of 5,500 pounds.

The American No. 6 has a 16-foot wheelbase, an overall length of 20 feet 1 inch, a height of 8 feet 9 inches with a cab, and an overall width of 6 feet 6 inches. Its turning radius is 30 feet.

Further information may be secured from the company, or by using the enclosed Request Card. Circle No. 30.

Valve-Dressing Unit

An addition to its Vibro-Centric line of valve-reconditioning equipment is announced by The Black & Decker Mfg. Co. of Towson, Md. This heavy-duty stone-dressing stand is recommended by its manufacturer for use where speed and accuracy are required.

The heavy-duty unit is made of iron castings held to close tolerances, and all bearings are sealed from abrasive dusts. According to the manufacturer, there is no chance of distortion in the dressing operation.

The calibrated quadrant is marked in all popular angles and is read from the top for easy visibility. The quick-acting screw-lock clamps are adjusted by hand without the need for any tools. They can be set to all combinations of stone up to 6 inches and angles of from 0 to 90 degrees. The unit can be bolted to any bench or to the work top of the Black & Decker valve-shop cabinet. Standard equipment includes an adjustable arm with diamond point and screw-feed nib, mounted on Timken tapered roller bearings, and an adjustable mandrel.

Further information may be secured from the company, or by using the enclosed Request Card. Circle No. 69.

Chargers and Welders

Two new lines of battery chargers and electric-arc welders are announced by the Sterling Machinery Corp., 405 Southwest Blvd., Kansas City, Mo. The battery chargers are available in three styles, the arc welders in five.

The Model B-6-80 charger is for 6-volt batteries and operates on an input of 115 volts ac at 12 amps. The Model B-6-100 is for 6-volt batteries and features three individual cell meters of the moving-coil type. The Model B-6-12-100 can be used for cycling and charging both 6 and 12-volt batteries. For primary input, it requires 115-volt 50 to 60-cycle ac at 14 amps for 6-volt charging and 28 amps for 12-volt charging.

The Model W180-60 electric-arc welder has a current range of from 20 to 180 amps, and will handle 1/16 to 5/32-inch rods. According to the manufacturer, 16 heat changes are possible with the unit. The Model W180-60-C is similar to this model except that it is equipped with a capacitor. The Sterling Model W200-30 has a capacity of up to 3/16-inch rods, a welding range of from 5 to 200 amps, and 30 heat changes. The Model W250-36 will take rods of up to ¼-inch diameter, and has a welding range of from 5 to 250 amps and 36 heat changes. The Model W350-42 is designed for heavy-duty work. It has a welding range of from 5 to 350 amps and 42 heat changes. All of the Sterling welders are designed to run on an ac input.

Further information may be secured from the company, or by using the enclosed Request Card. Circle No. 127.

New Bulletins Describe Wheel Tractor and Grader

Two new bulletins are being distributed by the Tractor Division of the Allis Chalmers Mfg. Co., Milwaukee 1, Wis. One of them deals with the Model BD 50.5-hp diesel motor grader, and the other with the Model IB wheel tractor. The tractor bulletin includes a blow-up view of the steel frame, a description of the flexibility and economy features claimed for the IB, and a list of specifications.

The grader bulletin contains a blow-up view of the unit stressing its large size. It also pictures the location of controls, the operator's platform, the 12-foot-long moldboard, the diesel-engine power unit, and other features, and lists specifications.

Copies of this literature may be obtained from the company. Or use the enclosed Request Card. For the motor-grader bulletin, circle No. 124; for the tractor, No. 125.

Surveying Instruments

A 4-page brochure on a line of surveying instruments is being distributed by C. L. Berger & Sons, Inc., 37 Williams St., Boston 19, Mass. Feature of the bulletin is a 4-color cover picture of the Berger Type R transit. On the center spread are photographs and code names for twelve types of Berger surveying instruments, including dumpy and wye levels, transits, plane-table alidades, and others.

On the last page of Bulletin N-648 is a table giving the lengths of circular arcs. The table has been prepared using a radius of 1, and contains lengths of arcs in seconds, minutes, and degrees up to 120. The brochure also lists several well known surveying projects on which the Berger instruments were used.

Copies of this literature may be obtained from the company. Or use the enclosed Request Card. Circle No. 108.

MECHANIZATION OF CONCRETE PAVING Begins Here

Even back in those days when aggregate was hauled to the job in horse-drawn dump wagons, paving contractors were depending on Blaw-Knox Clamshell Buckets. It was their first "mechanized tool."

Today, with such efficient roadbuilding machines as Blaw-Knox Precision Subgraders, Paving Spreader-Vibrators and Finishing Machines, it's the Clamshell Bucket that "starts the ball rolling."

Whatever your requirements are for digging, trenching, dredging or rehandling—you will find among the hundreds of different types and sizes a Blaw-Knox Bucket that's exactly *right* for the job.

BLAW-KNOX DIVISION of Blaw-Knox Company
2067 Farmers Bank Building, Pittsburgh 22, Pa.
New York • Chicago • Philadelphia • Washington • Birmingham
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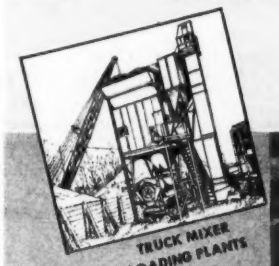
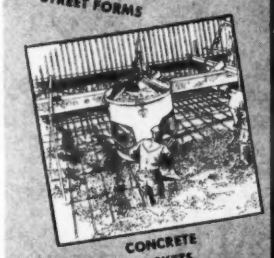
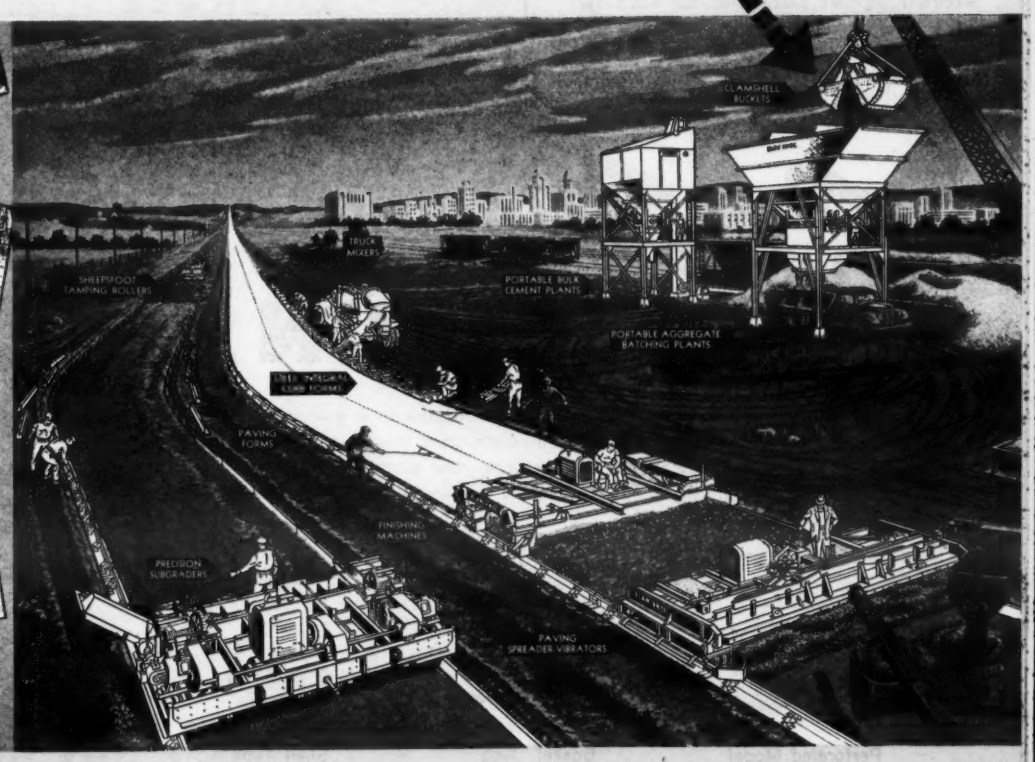
See your nearest Blaw-Knox Distributor


TRUCK MIXER LOADING PLANTS

STEEL STREET FORMS


CONCRETE BUCKETS

HEAVY STEEL FORMS



BLAW-KNOX

Time and Labor Saving CONSTRUCTION EQUIPMENT

Suspension Bridge Is Completed in 10 Days

At the Center Hill Dam project in Lancaster, Tenn., a foot-walk suspension bridge was recently completed in 10 days by Massman, Metcalfe, Hamilton Co., Inc., contractors of Kansas City, Mo. It replaces a vehicle bridge washed away by flood, and is now used for foot travel from the contractors' offices to the construction area. At the present time, it is the only river crossing within several miles.

The bridge consists of one span measuring 550 feet between towers. The towers are made of steel angle iron and are approximately 5 feet square. One tower is 48 feet tall and the other is 43 feet tall in order to make the suspension points level. Both towers are guyed to deadmen in three directions by ¾-inch cables.

The ¾-inch steel-wire suspension cables are sagged 43 feet below the suspension points. Two supports of ⅝-inch rod run from the suspension cables to the deck of the bridge at intervals of 10 feet. The deck has a 5-foot camber. The handrails are ⅝-inch steel rod placed 3 feet above the deck level. A 3-foot web fencing runs from this rail to the deck. The deck flooring consists of two 2 x 12-inch planks supported at 10-foot intervals.

Signs are posted for persons to remain at 20-foot intervals so as not to overload the bridge. In high winds, there is a considerable swinging motion to the center section. In fact, a person walking with an even gait can easily cause the bridge to swing vertically for more than a foot, and it is often necessary to change one's walking pace in order to counteract this motion.

This suspension bridge, built in 10 days to replace a vehicle bridge washed away by flood, connects the work area at Center Hill Dam with the contractor's office.

Asphalt-Paving Plants

Catalogs on the Standard portable asphalt plants are available from Standard Steel Corp., 5001 Boyle Ave., Los Angeles 11, Calif. Standard plants are built in seven sizes with mixer capacities ranging from 500 to 7,000 pounds, and with production rates varying from 20 to 260 tph based on a 45-second mixing cycle.

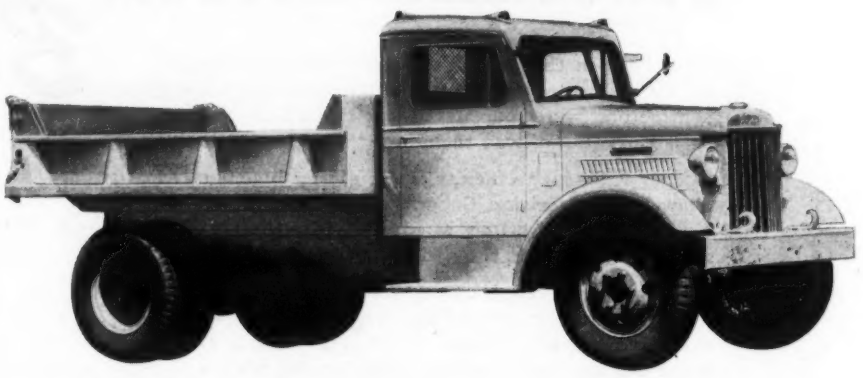
Catalog No. 725 gives a complete description of the unit-built crane-erected asphalt plant and its working parts. It illustrates and describes, in detail, the twin-shaft pugmixer, the cyclone dust collector, the direct-heat rotary drier, the paving-plant boiler, the elevator and screw, and the asphalt and oil tank. A 2-page spread shows the completely assembled plant. Another two pages of the catalog describe the Standard automatic electric weighing and timing unit designed to handle four materials without manual attention. The unit can also be set up for manual operation, if desired. Finally, the catalog illustrates how the plant can be dismantled for rapid transporting.

The one-page Bulletin No. 515 covers the straight-in-line Type A portable asphalt plant manufactured by Standard. It describes the three sizes in which it is made, illustrates the mixing and loading unit and the screen and bin unit, and pictures the completely assembled machine. It also lists special features of the Type A.

Copies of this literature may be obtained from the company. Or use the enclosed Request Card. Circle No. 82.

Link-Belt Pa. Manager

Crozier S. Wileman has been appointed District Sales Manager of the Link-Belt Co. office at Wilkes-Barre, Pa. He succeeds A. C. Williams, who has retired after 43 years of service. Mr. Wileman will be assisted by Alton H. Ziegler who has been transferred from the Philadelphia district sales office.



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- WIDE 66" CAB—CARRIES THREE
- OPTIONAL WHEEL BASE—140" TO 172"
- HEAVY-DUTY, 113-HP ENGINE
- RUGGED, BUILT-TO-TAKE-IT CONSTRUCTION

DUPLEX
TRUCK COMPANY
LANSING 4, MICHIGAN

SERVING THE CONSTRUCTION FIELD FOR OVER 40 YEARS WITH TRUCKS DESIGNED TO CUT CONSTRUCTION AND MAINTENANCE COSTS.

PROTECTED DEALER FRANCHISES AVAILABLE IN SOME AREAS

Save Money with YAUN

Yes, YAUN saves you money. Every bucket is engineered to give years of faithful, profitable service. All welded construction, perfect balance and the satisfaction of thousands of users are your guarantee that YAUN does the job right. If you haven't become familiar with YAUN'S buckets, ask your dealer.

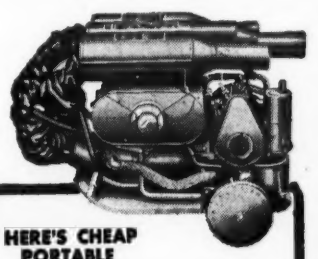
Perforated Model

Basket Type

Shell Type

YAUN DRAGLINE BUCKETS AND MFG. PLANT
BATON ROUGE, LA.

Write for folder



HERE'S CHEAP PORTABLE HEAT FOR ALL

Portable Heaters expedite Winter work at small cost! Emergency heat for any purpose. **DRIES** concrete, plaster, grain, paint, lumber, etc. **STARTS** cold motors, trucks, tractors, airplanes, etc. **THAWS** frozen materials, plumbing, machinery and men.
These Stewart Warner war surplus preheaters produce 100,000 B. T. U.'s per hour on 1½ gallons gas and deliver same anywhere thru three long ducts. Starts like outboard motor. Order now...Supply limited. Spare parts available.
Enclose check or money order or send ⅓ deposit, balance C. O. D. with privilege of examination.

New and unused.	Rebuilt and test run
~~$330.00~~	~~$630.00~~
Now	Now
$295.00 F.O.B.	$187.50 F.O.B.

Quantity Discounts

KARL ORT
Department CE
YORK, PA.

New Waysides Added To Highway System

Virginia Plants Korean Lespedeza for Erosion Control on Slopes; Work Done by Machines

✦ THIS year the Virginia Department of Highways has added three new wayside parks to its highway system as part of its roadside-development program. The additional waysides for parking and picnicking bring the number of such facilities now scattered along the main highways of the Old Dominion State to 37. Many of them have been given picturesque names, appropriate to the locality or history of the region, such as "Lovers Leap", "Oxford Furnace", "R. E. Lee", "Blue Ridge", "Appomattox", and "Mariners Museum", to mention but a few. Besides giving the traveling public an opportunity to pull off the highway and park in pleasant surroundings, many of the waysides make available drinking water and sanitary facilities. They are extremely popular for picnic parties.

Of the three new waysides, one is known as "Elizabeth River". It is located in the southeastern part of the state in Norfolk County on U. S. 13, the Norfolk By-Pass to the south of the port city. The 4-acre site provides a small shelter, sanitary facilities, picnic tables, chairs or benches, and stone fireplaces.

Near historic Fredericksburg, in Stafford County, on the new U. S. 1 By-Pass just west of the city, a new 2-acre wayside is called the "Mary Washington". It is named after the mother of George Washington, who was born in old Fredericksburg. This site has picnic tables, benches, and fireplaces, along with the usual space for parking cars. On the main highway between Washington and Richmond, this spot has become very popular in the short time that it has been open. The new by-pass was completed last year.

The latest of the waysides is the "Roanoke" in the western part of the state, on U. S. 11 near Salem in Roanoke County. It occupies a pretty 2½-acre plot of ground on the Roanoke River, and has the usual parking area, sanitary facilities, picnic tables, benches, and fireplaces.

In addition to these wayside parks, the State Highway Department has 1,500 picnic tables spotted along the main roads at from 5 to 10-mile intervals. They are installed a few feet back from the roadway at locations where the right-of-way is wide enough to permit such improvements. The shoulder of the road is also widened so that the motorist may park a safe distance off the pavement. Signs along the road in advance of the site bring these facilities to the attention of the traveler.

This roadside program of wayside parks and picnic tables is slowly expanding as the necessary right-of-way easements are obtained and funds are appropriated for the work. Last winter's estimated $3,500,000 damage to the Virginia highway system has necessarily retarded the plans for more extensive wayside improvements.

Erosion Control

This past spring the Department spent around $90,000 on erosion control and drainage as part of its roadside-development program. The work was chiefly done on recently finished highway contracts—either construction or reconstruction. Highway contractors do not like to get involved with landscaping items in an ordinary road contract, according to Department officials, so the usual procedure has been to handle shoulder and slope work after the main contract has been completed. Dual highways with a median strip are an exception to this. Seeding or sodding of this center area is normally included in the grading or paving contract, for if this were deferred until later, the landscaping operations would interfere with the free flow of traffic along the new highway. So on a dual highway this work is made part of the original contract.

The bulk of the erosion-control work, done chiefly by the Department's own forces, consisted of fertilizing, seeding, and mulching slopes that were already laid back to the required slope lines in the grading contract. Korean lespedeza was used to a great extent for seeding the bulk of these slopes, without first putting down any topsoil; this resulted in a considerable saving. It is recognized that this choice of seed will

(*Concluded on next page, Col. 3*)

Jobs Done Quicker, Cheaper

Attached to Tractors, Bulldozers, Motor Graders and Scrapers, the Automatic Slope-Meters are in use on the construction of highways, airports, dams and building sites. Slope-Meters are compact, sturdily constructed instruments that will automatically show the operator the exact grade or slope on which he is working.

Order from Your Equipment Distributor Today
NATIONAL DISTRIBUTION BY
WM. H. ZIEGLER CO., INC.
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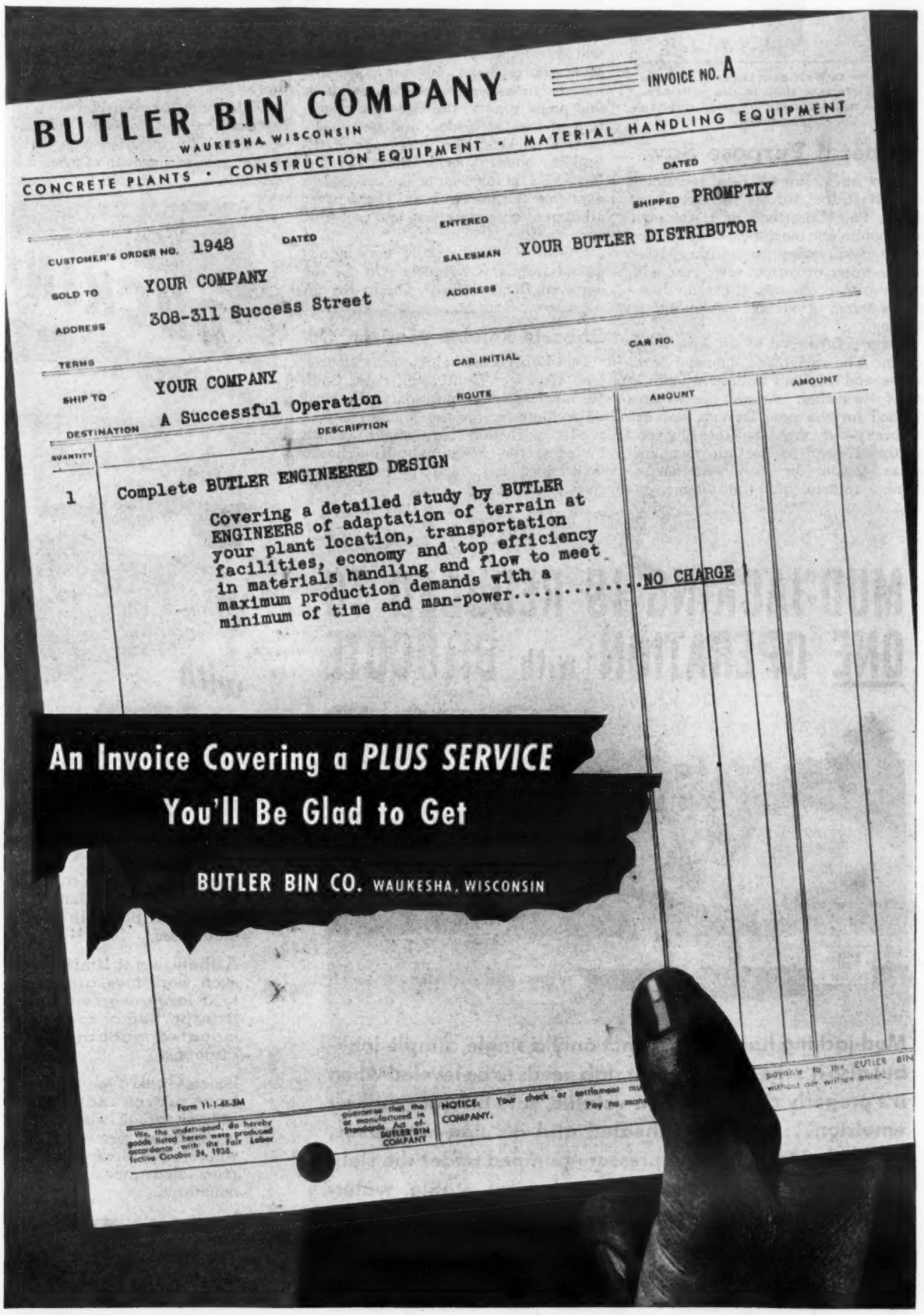
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CONCRETE PLANTS • CONSTRUCTION EQUIPMENT • MATERIAL HANDLING EQUIPMENT
INVOICE NO. A
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CUSTOMER'S ORDER NO. 1948
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SALESMAN YOUR BUTLER DISTRIBUTOR
SOLD TO YOUR COMPANY
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DESTINATION A Successful Operation
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1
Complete BUTLER ENGINEERED DESIGN
Covering a detailed study by BUTLER ENGINEERS of adaptation of terrain at your plant location, transportation facilities, economy and top efficiency in materials handling and flow to meet maximum production demands with a minimum of time and man-power.....NO CHARGE
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You'll Be Glad to Get
BUTLER BIN CO. WAUKESHA, WISCONSIN
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We, the undersigned, do hereby guarantee that the goods listed herein were produced or manufactured in accordance with the Fair Labor Standards Act of...
BUTLER BIN COMPANY
NOTICE: Your check or settlement must be made payable to the BUTLER BIN COMPANY. Pay no money to any person without our written order.

YOURS FOR THE ASKING . . . .

Check the Red Request Card!

For further information on the new equipment, new materials, and new literature described in this issue of *Contractors and Engineers Monthly,* check the item number on the enclosed Red Request Card pages 16 and 88. No obligation, of course, and we will forward your request directly to the manufacturer.

Contractors and Engineers Monthly, 470 Fourth Ave., New York 16, N.Y.

This new DeWalt saw is designed to be a complete saw shop in one unit, handling a wide variety of wood-working operations.

General Purpose Saw

A new model saw has been announced by DeWalt, Inc., 101 Martha Ave., Lancaster, Pa. Described as a complete saw shop in one machine, it can be used as a cut-off, miter, rip, tilting-arbor, double-miter, or variety saw. And with the proper accessories, it can do dadoing, gaining, grooving, rabbeting, or shaping.

Power is furnished by a 3-hp electric motor. The saw-blade diameter is 14 inches, and it is said to have a depth of cut of 4⅛ inches. Among the features claimed for the new DeWalt saw are the heavy-duty eight-ball-bearing roller travel head riding on machined tracks inside the arm; mechanical aligning adjustments at all moving positions; a safety guard designed to provide maximum protection to all operations; and an adjustable dust spout to direct flow of sawdust.

Further information may be secured from the company, or by using the enclosed Request Card. Circle No. 87.

Versatile Tractor Shovel

A 4-page folder about the Sargent Overhead tractor shovel is being distributed by Maine Steel, Inc., S. Windham, Maine. This unit, designed primarily as a tractor shovel, features nine conversions—backhoe, bulldozer, angle grader, log loader, excavating bucket, stockpile bucket, shoulder bucket, coal bucket, or snow bucket.

Among the features of the unit illustrated in Folder No. 450 are the single-lever-control hoist, the down-pressure and balance feature of the bulldozer and angle grader, the one-man operation of the log loader, and the quick-change buckets. The final page of the bulletin gives specifications for the Model B and for each of the accessories available for use with it. These cover all dimensions, capacities, and performance abilities.

Copies of this literature may be obtained from the company. Or use the enclosed Request Card. Circle No. 59.

Ebberts Rejoins Madsen Co.

Dan Ebberts has rejoined the Madsen Iron Works of Huntington Park, Calif. He now holds the position of National Sales Manager for the Madsen line of road-construction equipment, which includes the Madsen-built Johnson float finisher, asphalt-paving plants, road pugs, etc.

New Waysides Added To Highway System

(*Continued from preceding page*)

not result in an ideal turf at the beginning, but that later on when the natural grasses develop and grow, the slopes will be more than adequately protected against erosion and will also present a pleasing appearance.

The ordinary seed mixture used contained about 60 per cent Korean lespedeza, and the rest grass seed native to the region where it was being sown. Thus in the Tidewater region, rye and Bermuda-grass seed were added to the Korean lespedeza; in the Piedmont section the mix included redtop; while in the Shenandoah Valley the mix contained bluegrass seed. The mix was sown at the rate of 80 pounds to the acre.

This may be considered a heavy application, but in soils that are far from ideal the experience has been that to get a normal growth of grass a heavy application has been necessary. Furthermore seed is cheap compared to the labor required in planting, and to reduce this expensive cost of labor the erosion-control work was done by machine to a wide extent. Fine-grading, scarifying, dragging, fertilizing, and seeding were all done by machine to eliminate the costly hand labor.

To take care of the deficiency or total absence of topsoil, a fertilizer was used that supplied 2 pounds of nitrogen, one pound of phosphorus, and one pound of potash for every 1,000 square feet of surface area.

The roadside-development program of the Virginia Department of Highways is under the direction of Harold J. Neale, Landscape Engineer. James A. Anderson is Commissioner, and C. S. Mullen is Chief Engineer of the Department.

U. S. Savings Bonds are security bonds. Their purchase provides for your personal security as well as the economic security of the country.

MUD-JACKING IS REDUCED TO ONE OPERATION with BITUCOTE

Mud-jacking has become—not only a single, simple job—but also it's the *last* time that slab needs to be leveled when it's properly done with non-volatile, safe Bitucote asphalt emulsion... It's used unheated and it's non-hazardous.

Added to the slurry, pressure-pumped under the slab, it *cures* and *dries* there as a permanent, stable, water-resistant sub-base that *forms its own seal* right to the top surface of the slab. This *seal*—plus stability and resistance to impact and compression—*stops pumping*.

Mud-jacking takes on greater practicability, safety and importance with Bitucote - stabilized slurry—and it's economical and time-saving, too.

Bitucote PRODUCTS CO.

Send for Bitucote improved procedure for one-operation mud-jacking.

1411 CENTRAL INDUSTRIAL DRIVE • ST. LOUIS 10, MO.
Plants in: Cincinnati, O. • St. Louis, Mo. • El Dorado, Ark.

'DUCKING BRIDGES'

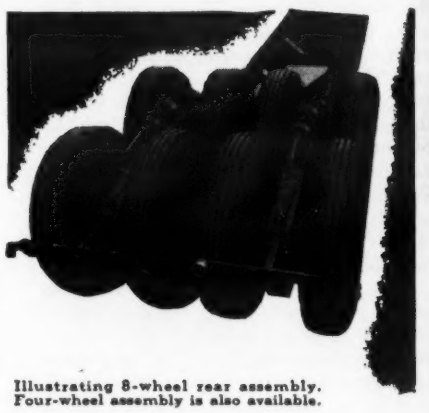
Photo Courtesy Weston Hauling, Inc., Glenshaw, Pa.

with 77 TONS OF SHOVEL ON A ROGERS GIRDER TYPE TRAILER

These heavy duty trailers are designed and built for the lowest possible road clearance.

Although not limited to such work they are used to a large degree in the transporting of crawler-mounted machinery of large size.

Rogers Girder Type Trailers have proven indispensable in areas where low bridges are prevalent or where other limited headroom clearances are encountered.



Illustrating 8-wheel rear assembly. Four-wheel assembly is also available.

Loading is accomplished by removing the rear wheel assembly. The machine moves into position over the girder. The frame is then jacked up and rear wheels attached. The load is in position ready to roll.

ROGERS BROS. CORP.

DESIGNERS and BUILDERS OF HEAVY DUTY TRAILERS SINCE 1915

EXPERIENCE builds 'em PERFORMANCE sells 'em

108 ORCHARD ST. ALBION, PENNA.

Electrically Driven Steam-Cleaning Unit

An electrically driven steam cleaner for use with construction and automotive equipment is made by the Hartman Corp. of America, 6417 Manchester Ave., St. Louis 10, Mo. Because this unit is electrically driven, it features extreme portability since its set-up is limited only by the distance to a source of current.

Among the other features claimed for the Hartman cleaning machines are the temperature cut-out switch, the safety blow-off valve, solution pressure switch, controlled spray, electric heating, and air-cooled handles. A rotary-type water pump is designed to maintain constant pressure regardless of the amount of flow through the nozzle.

The Hartman cleaner is powered by a ½-hp 220-volt single-phase 60-cycle ac motor. Operating pressure is 100 psi, and in-put draw is 13 kw. The unit is equipped with 20 feet of high-pressure Neoprene oil and grease-resistant hose, and a 0 to 200-pound pressure gage. Hartman also furnishes Hi-Power heavy-duty cleaning compound, and Lo-Power granular cleaning compound for use with this equipment.

Further information may be secured from the company, or by using the enclosed Request Card. Circle No. 104.

Rollers and Power Graders

Literature describing its line of road rollers and power graders is being distributed by the Austin-Western Co., 601 Farnsworth Ave., Aurora, Ill. Catalog No. AD-1942, dealing with the A-W rollers, contains detailed information on the 5 to 8 and 8 to 10½-ton tandems; the 10 and 12-ton Autocrat; and the 6, 7, and 8-ton Cadets. Also listed in this bulletin are several A-W attachments such as the hydraulic scarifier, spikes and spuds, canopy and curtains, starter and lights, roll-sprinkler system, auxiliary hand steer, and the Austin-Western adjustable third axle and center roll, known as the Roll-A-Plane.

Catalog AD-2016R1 on the power graders covers the Model No. 99-H all-wheel steer and all-wheel drive unit. In addition to listing specifications, the catalog points out special features of operation. Photographs show the grader in use on several types of maintenance and construction operations.

Bulletin AD-2002R1 describes and illustrates the No. 55 grader.

Copies of ths literature may be obtained from the company. Or use the enclosed Request Card. Circle No. 39 for the catalog on rollers, No. 40 for the one on the 99-H grader and No. 41 for the 55 grader.

Light-Duty Engine

A light-duty gasoline engine is manufactured by Uebelhoer Bros., Inc., 848 Kensington Ave., Buffalo 15, N.Y. The Model U-100 Ultimotor is rated at 2.4 hp at 3,000 rpm. It is recommended by Uebelhoer for use with saws, pumps, hoists, sprayers, conveyors, compressors, and other equipment in this horsepower range.

The Ultimotor governor is of the centrifugal type with provision made for cable control. The oil system consists of a gear pump and splash combination. The unit has a high-tension crankshaft magneto with a dust shield. It has 2 compression and 1 oil-control piston rings. According to the manufacturer, the Ultimotor can be furnished with a 6 to 1 internal-geared speed-reduction drive. Weight of the Ultimotor is 43 pounds.

This light-duty gasoline engine, the Model U-100 Ultimotor, is rated at 2.4 hp at 3,000 rpm. Its governor is of the centrifugal type with provision made for cable control.

Further information may be secured from the company, or by using the enclosed Request Card. Circle No. 128.

Northwest Names Stoughton

F. A. Stoughton has been named District Sales Manager in the Pittsburgh area by the Northwest Engineering Co. He will make his headquarters at 487 McCully St. in Pittsburgh.

Push-Type Rippers

A push-type ripper is announced by the Jonnum Mfg. Co. of Pittsburgh, Kans. It is built in models for attaching to most standard makes of bulldozers. The manufacturer recommends the use of two ripper arms spaced about 3 feet apart, and set to dig at a depth of 12 inches. Additional arms can be provided if desired.

The Jonnum push-type ripper is made in four models. The Model No. 1 weighs about 175 pounds, and is designed for use on tractors with a power range of up to 50 hp. The No. 2 weighs about 225 pounds, and is designed for use on tractors in the 50 to 70-hp range. The No. 3 weighs about 300 pounds, and is for use with tractors in the 70 to 90-hp range. The No. 4 weighs about 400 pounds, and is for use with tractors having a power range of over 90 hp.

Further information may be secured from the company, or by using the enclosed Request Card. Circle No. 27.

Joins Concrete Pipe Co.

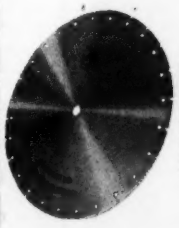
William Mooney II has joined the Universal Concrete Pipe Co. in Atlanta, Ga., as Sales Representative for the southeastern area. Mooney formerly was connected with the Raymond Concrete Pile Co. of New York City.

With FELKER DI-MET HEAVY DUTY CONCRETE CUTTER

NET WEIGHT 466 LBS.
SHIPPING WEIGHT 600 LBS. MAX.

Features:

2 CYL., 10 H.P. GASOLINE ENGINE.
Less vibration, greater power.
POSITIVE WATER TURN-ON.
Insures against dry wheel operation.
HYDRAULIC DOWNFEED RETARDER.
Eases diamond blade into concrete. No sudden shocks.
DOUBLE END SPINDLE.
For right or left hand operation.
ONE MAN PORTABILITY.
PRECISION BUILT.
Engineered and built by DI-MET to insure maximum DI-MET diamond wheel performance. More power to spindle means constant cutting speed, longer wheel life.



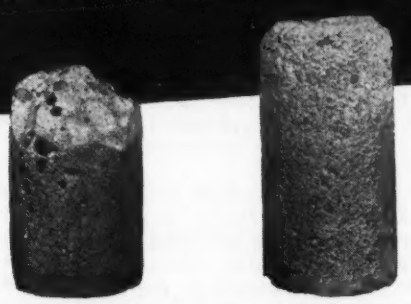
DI-MET CONCRETE CUTTING WHEELS
For longest wheel life and fastest cutting use Felker DI-MET Segmented Concrete Cutting Wheels...the blades with the holes and slots. Designed for greater coolant circulation, freer cutting.
6" to 18" diameters.
6½" max. depth of cut.

Write for further information..

MANUFACTURED BY FELKER MANUFACTURING COMPANY TORRANCE, CALIF.
World's Largest Manufacturer of Diamond Abrasive Cut-off Wheels and Equipment
OFFICES AND DEALERS IN ALL PRINCIPAL CITIES

PROTEX AEA* INCREASES CONCRETE DURABILITY OVER 700%

*Air-entraining Agent



Concrete WITHOUT Air-entrainment Silicious Aggregate
This sample failed at 100 cycles of freezing and thawing. Expansion 0.6%. Weight loss 25%. Since 25% loss is considered equivalent to failure, further cycles of freezing and thawing were discontinued on the above sample.

Air-entrained Concrete—4.0% Air Silicious Aggregate
After 300 cycles of freezing and thawing the expansion was 0.2% and the weight loss was 4%. The above sample shows direct advantages that occur through use of air-entrainment in concrete.

This test conclusively proves one of the many important advantages of PROTEX AEA. Also, PROTEX air-entrained concrete is more workable, dumps, spreads and finishes more easily—saves time—labor—money! Gives concrete resistance to alkali-sulphate disintegration, improves resistance to scaling. Can be hauled without agitation, and in general protects the concrete against the usual causes of failure. It's tried! It's proven! Fully approved and widely used by U. S. Government agencies and A. G. C. Contractors. Specify PROTEX and get the best AEA.

LOW COST PROTEX DISPENSER...AUTOMATICALLY DISPENSES PREDETERMINED AMOUNT OF AEA.
Serving industry for 27 years.

FREE BOOK ON AIR ENTRAINMENT
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New Airport Is Paved In 100 Working Days

(*Continued from page 1*)

of the city was developed into a first-class military air terminal. Until this year, this airport also served private and commercial flying. Recently the Army, for reasons of military security, decided to restrict its use to military planes, and McCarran Field had to be replaced in short order to accommodate the Las Vegas silver-crazed air traffic.

Modern Airport Designed

Clark County hurriedly set to work. A 1,350-acre site for the new field was secured about 5 miles south of Las Vegas, and only about 2 miles from the fabulous Flamingo Hotel, first of a long line of swank gambling clubs. The job was enormous, because the airfield had to be built from scratch. The site was open desert covered with desert growth and shrubs.

The initial job called for 352,270 cubic yards of grading, but this figure was later revised upward by approximately 25 per cent to improve the drainage pattern. It called for the construction of 30,000 square yards of parking and loading aprons to be built on a 14-inch-thick select-aggregate base of 9-inch portland-cement concrete. It called for some additional parking-apron work to be built of 3-inch asphaltic-concrete pavement, also on select-aggregate base.

The main paving part of the project, all of asphaltic concrete, was quite extensive. A main northeast-southwest runway 150 x 6,500 feet was built. Another east-west runway of the same dimension was called for, and paved 75-foot taxiways were built parallel to the full length of both runways. Six taxiways were also designed to connect the runways. A graded landing strip 300 x 4,500 feet was shaped up, and this may be developed later into another runway.

Also included under the initial contract were numerous drainage structures, 10,000 feet of 3-inch electrical-duct work, a beacon tower, sidewalks, curbing, and fences.

When the bids were opened by officials of the Clark County Public Airport, the lowest was that of Morrison-Knudsen Co., Inc., of Boise, Idaho. Work on the job was assigned to the Los Angeles office of the company's Highway Division. To push the job through in time, Morrison-Knudsen used an extensive fleet of grading equipment, crushing equipment, an asphalt plant, concrete equipment, and asphaltic-concrete equipment.

The select-aggregate base specified under the pavement is a 2-inch-minus material, well graded as to size. It was laid 10 inches thick under the main part of the runways, with 12 inches at the first 200 feet of each end, and 12 inches thick under all taxiways. Asphaltic-concrete pavement is 3 inches thick in the parking apron, 2½ inches thick on the ends of the taxiways and the 200-foot ends of the runways, and 2 inches thick on the main part of the runways and taxiways.

In addition to the large yardage of excavation, M-K had to crush about 165,550 cubic yards of select base and produce 45,000 tons of asphaltic concrete and 3,600 cubic yards of concrete.

Unusual Drainage Design

Especially efficient and safe drainage structures were included in the plans.

(*Continued on next page*)

This Giant

McKIERNAN-TERRY

SINGLE-ACTING PILE HAMMER

Handles Historic Jobs

IT is one of two S14 McKiernan-Terry hammers used on the construction of the great Potomac River Bridge at Ludlow Ferry, Md. Here it drove 194-ft. steel piles to cut-off 85 feet below water.

Later, one of these two huge, 14-ft.-tall hammers demonstrated its tremendous power for the Texas & Pacific Railroad in driving test piles for the Morganza Spillway in the lower Mississippi . . . Still again it drove piling for the approach to the Louisville & Nashville Railroad bridge over the Ohio from Howell, Ind. to Henderson, Ky. . . . And now these two hammers are being used on a pile-driving contract in Venezuela.

McKiernan-Terry Single-Acting Pile Hammers are specially designed to deliver powerful blows with a heavy mass ram at low velocity at point of impact. This is of vital advantage where substance to be penetrated offers severe resistance—blue clay, heavy "gumbo", incipient shale, hard pan, compacted gravel, etc. . . . Also in driving heavy mass piles, such as pre-cast concrete . . . They are the ONLY single-acting hammers that will operate under water, being totally enclosed . . . Supplied in five standardized sizes.

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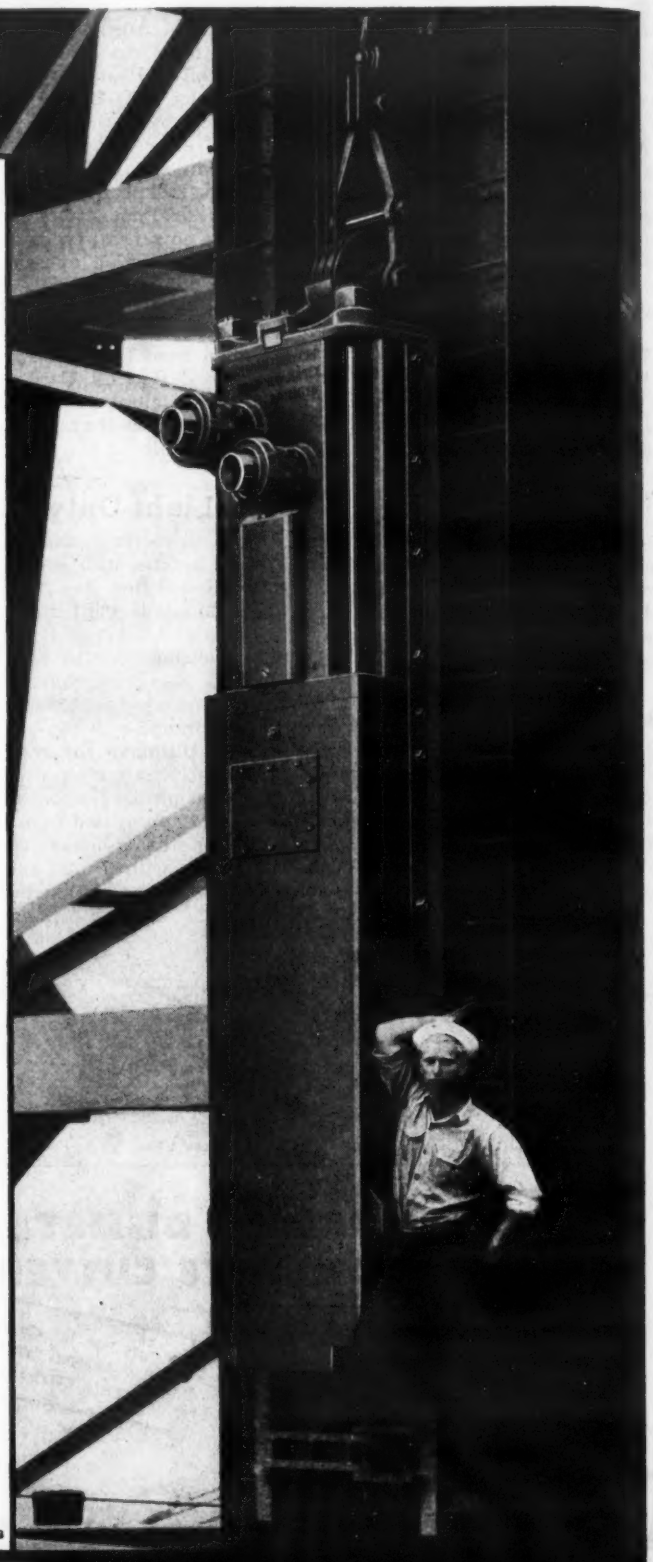
MK-248



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Inlet and outlet structures were covered by heavy steel grating and set flush with the pavement. In an emergency, a plane can pass over these structures without ground looping.

Underground pipe for the drainage system is 30 and 36-inch corrugated metal, and ties in to reinforced-concrete inlet and outlet structures.

Grading Goes Fast

Grading started off rapidly. The grading fleet included a large Euclid loader drawn by a Caterpillar D8 tractor; 15 bottom-dump Euclids; two new super-power Allis-Chalmers HD-19 tractors with scrapers; 11 Caterpillar D8's, 6 of them with scrapers; 4 Euclid 4,000-gallon water tank trucks; 3 sheepsfoot rollers; and 4 Caterpillar motor graders.

The areas under the runways, parking apron, and taxiways were first cleared and grubbed by Caterpillar D8's, whose bulldozer blades had been equipped with heavy steel brush rakes. These machines rooted out the mesquite brush and pushed it aside where it could be burned.

Earth-moving equipment then excavated the cut sections and deposited earth in fills. The material was generally a silty sand, common to the desert country of the southwest. It was powdery dry. Great clouds of dust, whipped by spring winds, drifted off through the desert. Two existing 6-inch wells failed to supply mixing water, so a new 12-inch well was drilled 300 feet deep. An International engine was hooked by belt to a 10-inch centrifugal pump to deliver 600,000 gallons of water per day to the transfer tank. This water supply was sufficient to keep the big Euclid tankers busily shuttling between the well and the fill.

Earth was laid down in 6-inch lifts, mixed with water by motor graders, and compacted to 95 per cent of density by sheepsfoot rollers. As the embankments were finished, they were dressed smooth by motor graders to blue-tops set by the survey party.

Crushing Base-Course Rock

The production of select-aggregate base material was centered around a 4¼-foot Symons cone crusher, driven by a 75-hp electric motor. Pit-run material was loaded by a Northwest 80-D shovel to Euclids and end-dumped to a feeder; the oversize stones were scalped off ahead of the crusher. Crushed rock from the crusher and screens was sent by conveyors to an 80-ton Bodinson transfer bin, where Euclids hauled it to the job.

Crushed rock for the hot-mix asphaltic concrete was also produced by this cone crusher.

The material had to be hauled about 1½ miles, on the average, to the airport. It was dumped in layers not over 5 inches thick, and shot with water by the tank wagons. Caterpillar motor graders then processed the material by road-mixing it thoroughly with water. After the material was well blended and water-bound, it was spread and rolled. Several 3-wheel Huber 8-ton steel rollers were used, and a loaded bottom-dump Euclid furnished pneumatic pressure also, where it was needed.

The material was so well graded, and processing methods so thorough, that excellent densities were obtained. It was the rule, rather than the exception, to exceed the 95 per cent minimum density which was required in the specifications.

The surface of all select base was carefully blue-topped by surveyors and left true to grade. The final surface was also left roller-smooth.

Concrete Paving

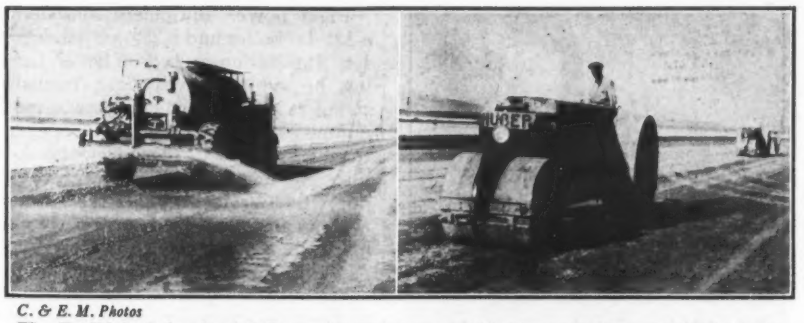
Concrete paving work on the parking apron was perhaps the least rushed of any part of the job. It was not practical to use extensive mechanical equipment there because of the diagonal pattern of the strips.

Blaw-Knox 9-inch steel road forms, set 25 feet apart, were used to form the sides of each strip. Concrete aggregates and sand were produced by the cone crusher and screening plant, after necessary adjustments were made, and the dry batches were weighed out to six batch trucks.

A Rex 27-E paver mixed the concrete. Portland cement was added at the paver from a stockpile of sacked material. Water was furnished by tank trucks. The concrete was dumped on the subgrade ahead of a Master vibratory spreader, and was smoothed and spread by that machine. Final finishing of the slabs was done by hand, using long-handled bull floats, steel templates, edging tools, and a belt finish.

Asphalt-Plant Set-Up

The one big time-consuming item of the job, however, was bituminous work. To run this phase of the job out on time, Morrison-Knudsen rented locally a Madsen 3,000-pound asphalt plant with appurtenances, and set it up near the airfield adjacent to the crushing plant.



C. & E. M. Photos

The Euclid tank truck at left sprays water on select-aggregate base material at the 1,350-acre Clark County Public Airport at Las Vegas, Nev. At right, 3-wheel 8-ton Huber rollers complete the select-aggregate base.

The plant consisted of the Madsen unit, a steam boiler, a 250-kw electric generating plant, asphalt and fuel tanks, and a fleet of hauling trucks. The ¾-inch-minus aggregate in the asphaltic-concrete mix was produced at the crusher.

Asphaltic cement, with a penetration factor of 100-150, was furnished to the job by Golden Bear Oil Co. of Los Angeles, Calif., and trucked 300 miles one way to the job by Oilfields Trucking Co. of Bakersfield. The big trucks, each pulling a trailer behind the regular load, delivered the bitumen to the job at a temperature hot enough to flow by gravity to the asphalt-storage tanks around the plant. A Fairbanks-Morse

(*Continued on next page*)

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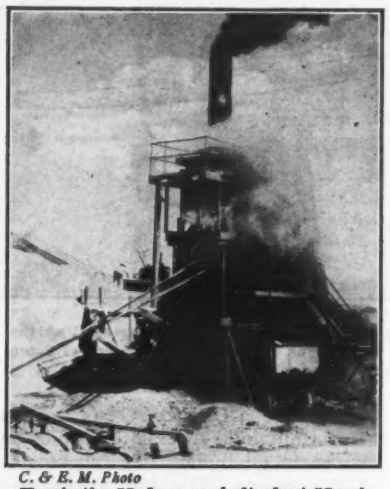


C. & E. M. Photo
Here's the Madsen asphalt plant Morrison-Knudsen rented locally for airport bituminous paving. The asphalt-storage tank is located in the foreground.

New Airport Is Paved In 100 Working Days

(Continued from preceding page)

steam asphalt pump was the only unit needed to circulate the bitumen through the plant.

Five asphalt-storage tanks, each holding 6,500 gallons, were used at the plant. They were equipped with steam coils to heat the asphaltic cement. In addition to this storage capacity, about 16,500 gallons of fuel for the boiler was stored in two horizontal tanks at the site.

Rock aggregate was stored close by the asphalt plant, so that a bulldozer could feed the material to the drier through a feeder chute. The rock sizes ran so consistent with the mix that the plant operator had little trouble staying within the limits as to size. In fact, the only thing usually rejected was sand.

Plant power equipment consisted of a 125-hp boiler and a 250-kw generating set. The stationary type of boiler, burning heavy 14-gravity fuel, furnished steam to heat all asphalt-storage tanks, pumped asphalt to the plant, operated the fuel pumps to the boiler and drier burners, and furnished power to the pugmill door rams. The 250-kw generator, powered by a Chicago Pneumatic diesel engine, furnished electric power to the motors which operated the cone crusher, asphalt-plant screens, hot and cold elevators, and conveyor belts.

In passing through the plant, rock aggregate was first fed to the cold elevator by a bulldozer mounted on a Caterpillar D8. The cold elevator hoisted the material up to a 24-foot drier. From the drier, a hot elevator took the rock up to the double-deck screens, which sized the material and sent it to the three bins that were used. From the bins, the rock was weighed out to the batch hopper, and went to the pugmill.

Asphaltic cement was circulated in a continuous loop from storage to the hot pot at the plant. This hot well stayed full at all times, and a by-pass arrangement permitted excess asphalt to recirculate.

The Symons sizing screens on this plant were of the flat, vibrating type. Each screen measured 42 inches x 10 feet and was separated into two sizes. The top deck consisted of a 1-inch mesh scalping screen and a ⅞-inch mesh, which passed the larger size of rock aggregate. The bottom deck was fitted with a ½ and ¼-inch mesh, the latter size passing sand to the sand bin. An intermediate rock size passed through the ½-inch mesh.

The aggregates were stored temporarily in bins located above the weigh hopper.

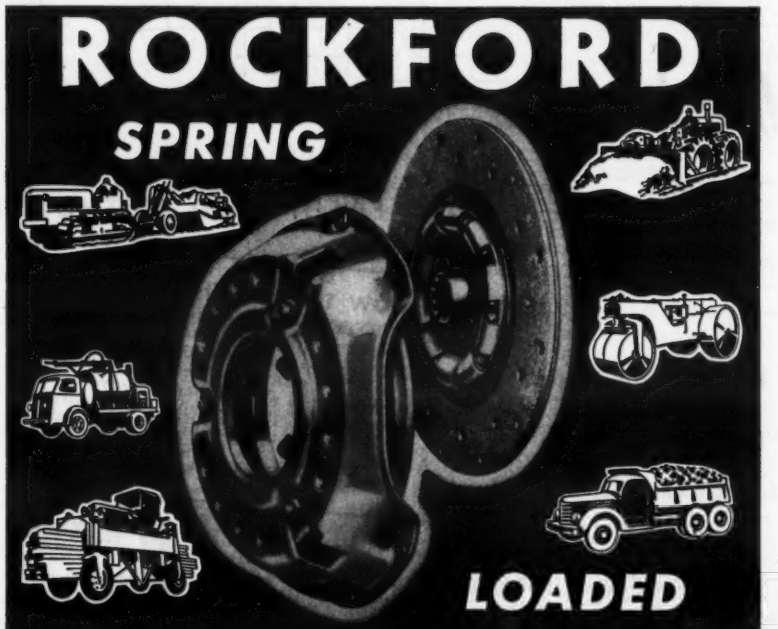
The asphaltic-concrete mix was designed on the basis of 5.5 per cent of bitumen and a 3,000-pound batch of aggregate. Batch weights consisted of 1,650 pounds of sand, 600 pounds of ½-inch rock, and 750 pounds of ¾-inch rock. The aggregates were weighed on beam scales, while a dial indicator was used in weighing asphaltic cement. The mixture stayed in the pugmill from 40 to 45 seconds before it was dumped to the haul trucks.

On this part of the job the men worked

(Concluded on next page)

C. & E. M. Photo
An Adnun Black Top Paver lays hot-mix on the new Nevada airport to flare out a corner of a taxiway approach.

ROCKFORD SPRING



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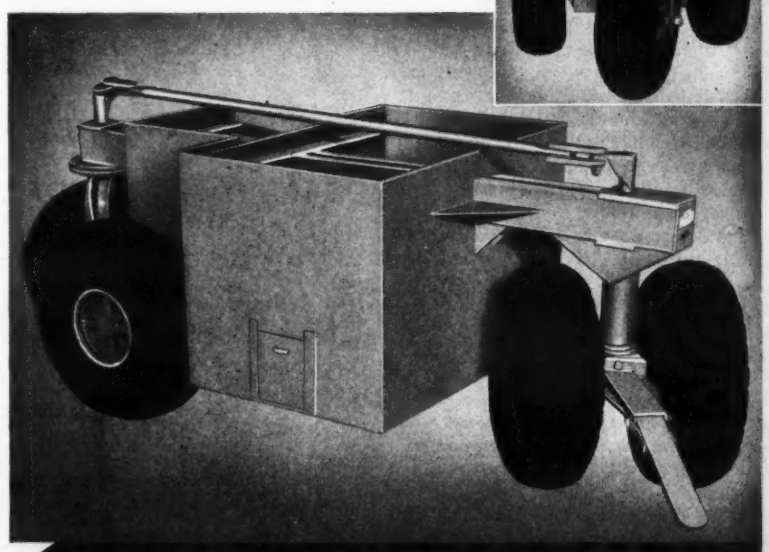

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two 9-hour shifts. In fact, all parts of the project worked double shifts to speed up progress.

Laying Hot-Mix

Laying the hot-mix was one of the most unusual parts of the job, because high summer temperatures in excess of 105 degrees often made it necessary for rollers to be 4,000 feet or more behind the laydown machine. A fleet of five trucks was rented on an hourly basis to deliver the mixed bituminous material to the airport.

An Adnun Black Top Paver was used for the first half of the project, beginning each strip in the center and then adding 10-foot lanes on either side until the strips had been completed. With the exception of the 3-inch pavement on parking aprons, all asphaltic concrete was laid in a single pass.

Later in the job, a Barber-Greene Tamping-Leveling Finisher was brought in and the Adnun paver was transferred to California where it was used on a job under way for the California Highway Department.

Two Buffalo-Springfield rollers, one an 8 to 10-ton tandem and the other a 10 to 14-ton three-axle tandem, compacted the asphaltic concrete. Before sunrise or after sunset, the roller worked about an hour behind the spreader, but during the hottest part of the day considerably more time was required to let the pavement cool. All rolling was done longitudinally, with special attention to the elimination of longitudinal joints along the strip edges.

Transverse joints at the end of a shift were feathered off and cut back square later on. The finished slab was checked with a 16-foot straight-edge to ¼-inch tolerance.

A light tack coat to seal the asphaltic-concrete pores, with some armor chips, completed the paving.

Personnel on Job

The project was under the general supervision of Ted Y. Johnston, Manager of the Highway Division of Morrison-Knudsen, with headquarters in San Francisco. Martin Green, General Superintendent for the M-K Highway Division, was Project Manager.

George Haensel was Job Superintendent, himself a veteran of the Fairfield-Suisun Air Base job and extensive airport work near San Francisco. F. F. "Tex" Smith was Assistant Superintendent; David S. Richards was Project Engineer; George Coons and Andrew Cathey were General Foreman; "Ace" Williams and George Borman were Grading Foremen; Clyde Gabbey was Structure and Paving Foreman; J. E. Arnold was Field Office Manager; and Ray Blanchard was Master Mechanic.

Quinton Engineers, Ltd., of Los Angeles and C. D. Baker of Las Vegas acted as designing engineers on the project, with John S. Barrett in charge for Clark County as Project Manager.

John (Big Jim) Barrett, a former Major in the Corps of Engineers, U. S. Army, is no stranger to the construction of airfields in desert areas. He was "brass-buttons" deep in the construction of McCarran Field at Las Vegas and the airfield at Indian Springs, Nev., during World War II. After construction was over, he handled all the maintenance on these two fields as well as several landing strips.

C. & E. M. Photo

Hot-mix airport paving is compacted by a Buffalo-Springfield tandem 10-ton roller. High summer temperatures on the job often made it necessary for the rollers to be 4,000 feet or more behind the laydown machine.

Now that the airport is complete, residents of the little settlement of Henderson can breathe easier. Henderson is a small community east of the job, down towards Hoover Dam. Early in the job, wind from the airport carried so much dust and dirt for miles that the city ran the following notice in its small newspaper:

"Found: One airport. Clark County and Morrison-Knudsen, owners, may have same by cleaning it up in Henderson streets and homes, and paying for the cost of this advertisement."

Marion District Managers

Stanley R. Shepard has been appointed District Manager of the upper New York State district which Marion Power Shovel Co. recently established, with headquarters at 225 Hansen Ave., Albany.

John K. Dolan has been named District Manager of Marion's Kansas City, Mo., office, to succeed Milton S. Pohler who has resigned. Mr. Dolan's headquarters are at 1016 Baltimore Ave., Kansas City. His new territory covers the entire states of Kansas, Nebraska, and Colorado, and parts of South Dakota, Missouri, and Oklahoma.

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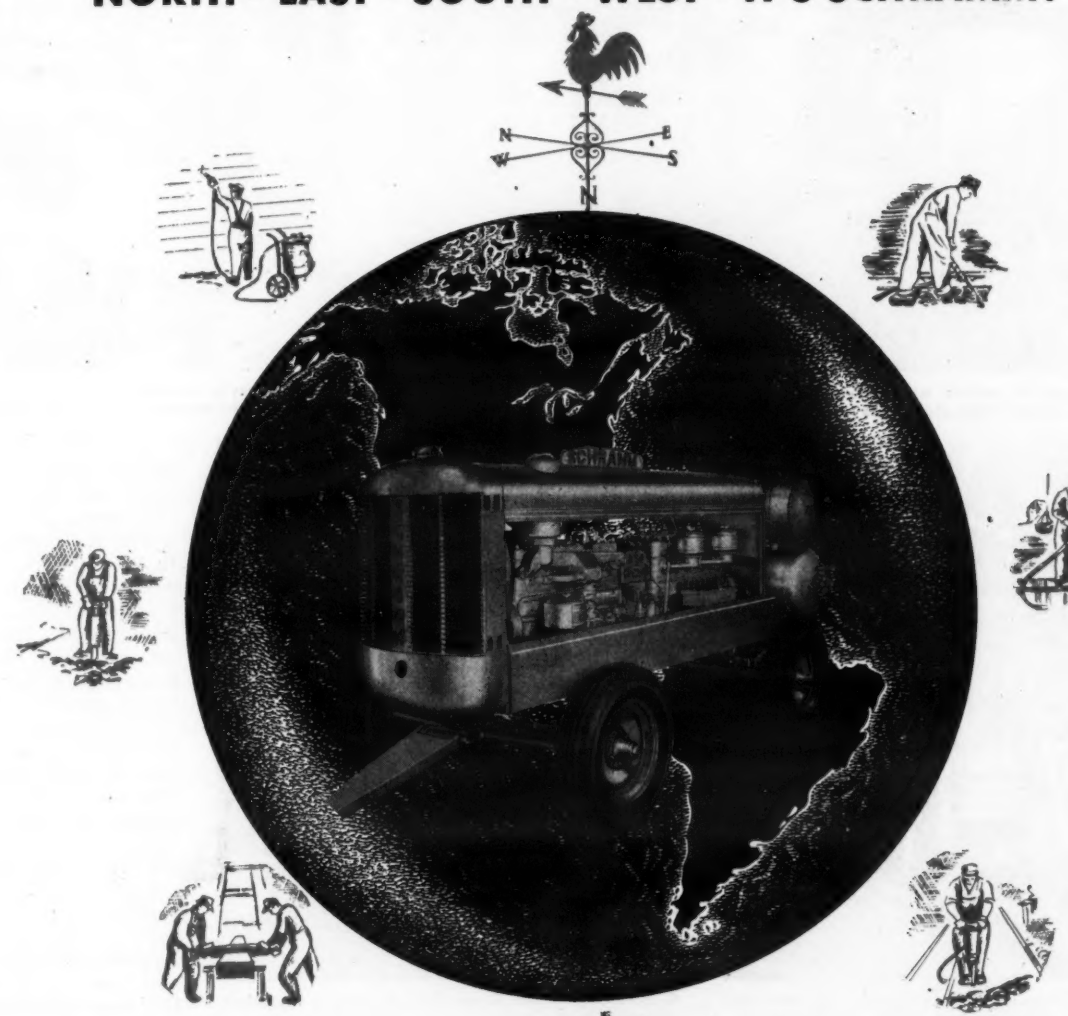

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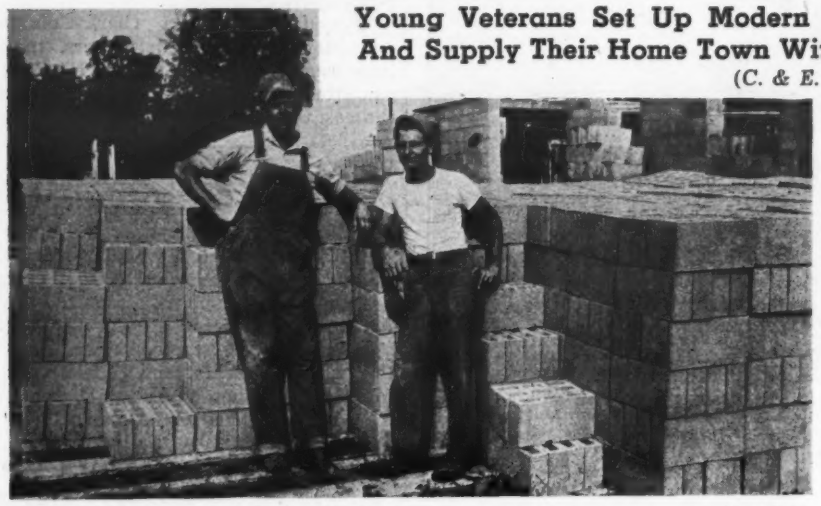
Two "Gamblers" Start a Building Business

Young Veterans Set Up Modern Small-Scale Concrete-Block Plant And Supply Their Home Town With Sorely Needed Building Material

(C. & E. M. Photos)

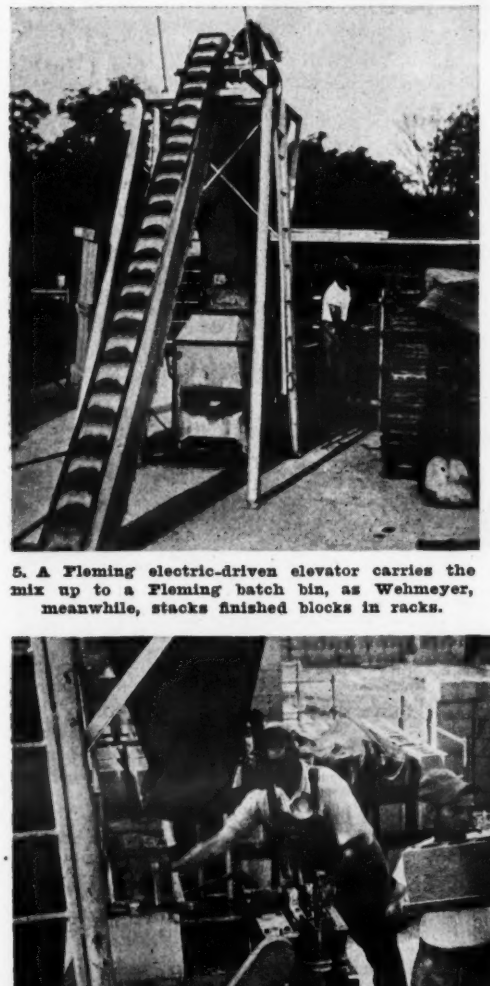


1. Now, a year or so after they came back from the war to Chamois, Mo., and set up shop, "gamblers" Steffen (left) and Wehmeyer are turning out 400 concrete blocks a day.

2. Until they can finish their 30 x 60-foot plant at the northwest edge of town, they are producing in the open on the plant foundation they have already poured.

3. Block production starts when Wehmeyer hauls wheelbarrows of sand and No. 8 torpedo gravel from stockpiles along the Missouri Pacific tracks to the plant.

4. With 3 parts of sand and 2 of gravel in the Fleming concrete mixer, he adds enough water to dampen, plus air-entraining cement, then mixes the batch 2 minutes.



5. A Fleming electric-driven elevator carries the mix up to a Fleming batch bin, as Wehmeyer, meanwhile, stacks finished blocks in racks.

6. Howard Steffen feeds the mix into a Kirkham vibrator head. About 1,500 cycles of vibration a minute consolidates the mix in the mold.

✦ CHAMOIS, Mo., thought Delmer Wehmeyer and Howard Steffen were crazy when they came back from war, set up a plant, and began to make concrete building blocks. The boys were crazy, all right—crazy like foxes. They picked a plant site on the northwest edge of town along the Missouri Pacific Railroad tracks, and poured the foundation for a 30 x 60-foot building. They arranged for deliveries of sand from the Jefferson City Sand Co. and for shipments of No. 8 torpedo gravel from the Missouri-Illinois Material Co. of Pacific, Mo. Then they rolled up their sleeves and pitched in to the business of producing concrete blocks for use in Chamois and the neighboring town of Linn.

Now, a little over a year later, the boys are turning out about 400 blocks a day, which they can deliver f.o.b. at a price of 18 cents each. Trucks come in every day to the plant to take the finished blocks away to Chamois and Linn, to be used for building foundations, milk houses on farms, basements, garages, and retaining walls. Recently, in Linn, the first all-new house was built with the material.

Utterly realistic about expenses, Steffen and Wehmeyer are running the plant themselves until they can expand and take on more men. Occasionally they hire a helper or a few high school boys to unload a car of material. Later, when they can free their own time a little more, they plan to do their own contracting, too. But meanwhile, "We've been lucky", they say. "All our business has come to us. We haven't had to do any selling yet."

7. As Steffen controls the rate of feed into the mold, Wehmeyer stacks blocks on a storage rack. The partners have three sizes of molds and 20 storage racks.

8. Finally, Steffen, using a Yale truck lift, wheels a load of blocks to one side to be dampened with a hose for two days, cured a week, and tested for strength.

This spider-like staging is suspended on a wire rope which winds on a power-driven drum beneath the platform of the unit. It has an up-and-down range of 650 feet and can be moved horizontally, by means of a transfer chain, without returning to the ground.

Power-Driven Stage Is Cable-Suspended

A power-driven staging unit which suspends from a single cable is announced by Spider Staging, Inc., 8th Ave. N., Renton, Wash. The manufacturer recommends it for use on off-the-ground work including painting, general maintenance, etc., on bridges, truss work of all kinds, storage tanks, and similar locations.

The stage itself is constructed of an aluminum alloy and has a double guardrail surrounding the operator. In use, the stage is suspended on an extra-flexible wire rope which winds on a power-driven drum beneath the platform of the unit. The stage is controlled at all times by the operator.

The Spider Staging power unit consists of a totally enclosed 172 to 1 reduction gear driven by a standard ⅓-hp capacitor-type electric motor or an Ingersoll-Rand No. 22H air motor. A standard Cutler-Hammer 3-button reversing switch controls ascent or descent of the staging at an average speed of 18 fpm. The cable permits a total vertical range of up to 650 feet.

Safety features include three independent automatic braking systems, any one of which is designed to prevent the stage from falling. In addition, an automatic overload switch cuts off power in event of an overload. The cable safety factor ranges from 5 to 1 to 14 to 1, depending upon the size and type of wire rope used. The worm-gear propulsion unit enables the staging to lift a ½-ton load, according to the manufacturer. The unit runs on any 110-volt ac lighting circuit, and can be modified to operate from a 220-volt power source.

The Spider Staging can be joined in pairs with a connecting platform to make a power-driven swing stage. Another feature of the staging is that the operator can move it horizontally without returning to the ground. This is accomplished by means of a special transfer chain with which it is equipped. Total weight of the unit is 170 pounds, including 125 feet of wire rope.

Further information may be secured from the company, or by using the enclosed Request Card. Circle No. 34.

Steam-Shovel Crew Tells A New Kind of Fish Story

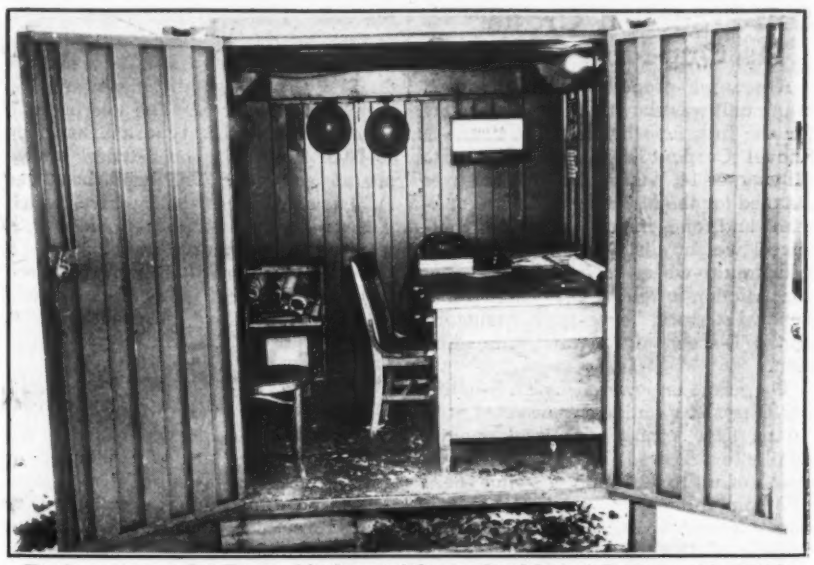
Members of a steam-shovel crew came up with a bigger and better fish story this past summer—only this one was true. It seems they were dredging a beach in The Bronx, New York City, along the East Chester Bay, when they scooped up a strange-looking 6-foot critter.

In the stress of the moment they jumped to conclusions—it must be a shark! So taking appropriate steps to protect themselves and the crowd that had gathered on the beach, they roped their catch and thrust a stick in its mouth to keep it from biting.

As it turned out, the critter was merely a mild-mannered porpoise who had been minding his own business in the city waters. He soon died—doubtless from the shock of encountering his first steam shovel—and was removed by The Department of Sanitation. He weighed about 500 pounds in fact, but you should hear that figure mounting in fiction, as each crew member re-tells the story.

New A-C District Manager

Max Bradshaw has been named District Manager for Ohio, West Virginia, and western Pennsylvania, by the Tractor Division of Allis-Chalmers Mfg. Co., Milwaukee. He joined the company 6 years ago as a material expediter. After World War II, he was transferred to the Tractor Division's Civil Engineering Department where he undertook testing and job study of Allis-Chalmers equipment in the field.



Here's a new use for Dravo shipping containers—furnish, install phone and electric light, and you have a temporary field office like this one which was set up on a job in eastern Pennsylvania. The steel container provides fire-resistant storage for records and blueprints, and it can be shipped intact from job to job, by truck or rail.

Enormous Capacity of minus 1" sand and gravel

● Morrison Knudsen Co. Telsmith 2-Unit Portable Crushing-Screening Plant near Ontario, California.

TELSMITH

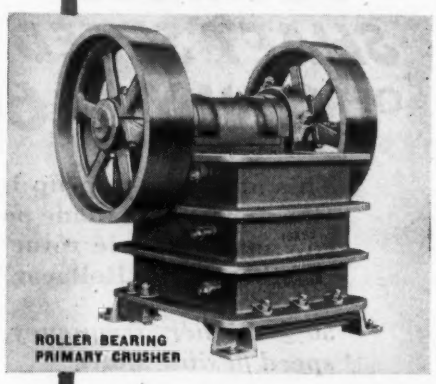
2-UNIT PORTABLE PLANT with Gyrasphere Secondary Crusher

● The MORRISON KNUDSEN CO. of Boise, Idaho, and California are producing about 275-300 tons per hour of minus 1-inch sand and gravel, for road building, with their Telsmith 2-Unit Portable Crushing-Screening Plant. Plant consists of . . .

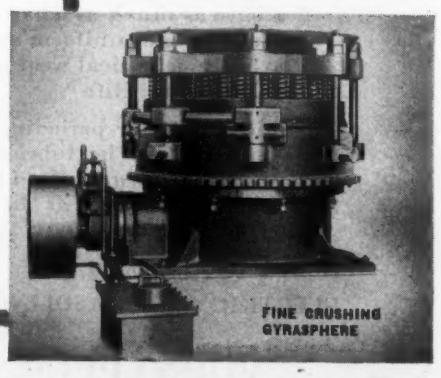
PRIMARY UNIT	SECONDARY UNIT
30" x 5'6" Plate Feeder	5' x 12' Triple Deck Sizing Screen
4' x 8' Double Deck Scalper	48" Gyrasphere Crusher
18" x 32" Roller Bearing Jaw Crusher	30" x 40' Plant Conveyor
30" x 25' Plant Conveyor	125 hp. Diesel Power Unit
105 hp. Diesel Power Unit	Five Feed and Stock-piling Conveyors

Primary Unit is taking pit run sand and gravel with 15" to 18" boulders, with the jaw crusher set at about 3". Material is then stock-piled, and fed to Secondary Unit, with Gyrasphere taking about 4" feed. Finished product goes to cement, and asphalt mixing plants. Here again, the Telsmith 2-Unit Portable Plant with Gyrasphere Crusher is giving remarkable capacities.

P-14



ROLLER BEARING PRIMARY CRUSHER



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Clyde Equipment Co., Portland 9, Ore., & Seattle 4, Wash. • General Machinery Co., Spokane 1, Wash. • Brandeis Machinery & Supply Co., Louisville 8, Ky. • Rish Equipment Co., Charleston 22, & Clarksburg, W. Va.—Roanoke 7, & Richmond 10, Va. • Wilson-Weesner-Wilkinson Co., Knoxville 8, & Nashville 6, Tenn.

Self-Propelled Crane Is One-Man-Operated

A new self-propelled wheel-mounted crane unit was shown at the Road Show for the first time by the Unit Crane & Shovel Corp., 6309 W. Burnham St., Milwaukee 14, Wis. Among the features claimed for the Model No. 1520 are one-man and one-engine operation, balanced weight distribution, dual-chain and multi-wheel drive, hook-roller construction to relieve the center pin of vertical stresses, sleeve-type outriggers, and a 4-speed air-operated transmission.

The crane is powered by an 8-cylinder Chrysler gasoline engine rated at 78 hp at 1,800 rpm, with diesel engines available if desired. It has a road-travel speed of up to 12.7 mph, a swing speed of 5 rpm, a hoist-line speed of 155 fpm, and a crowd-chain speed of 120 fpm. Speeds of 155 fpm are listed for the clamshell holding line, the clamshell closing line, the dragline pull line, dragline hoist line, and the 6-part independent boom-hoist line.

Boom lengths are as follows: for the shovel, 19 feet; for the crane, clamshell, and dragline, 35 feet; for the trenchhoe, 19 feet; for the shovel dipper stick, 14 feet; and for the hoe dipper stick, 8 feet 9 inches. A capacity of ¾ cubic yard is listed for the dragline and clamshell buckets, the shovel, and the hoe bucket. Total weight of the unit, with gasoline engine but minus the rear bumper and high A-frame, is 49,000 pounds.

Steering is hydraulically controlled. Turning radius of the Model 1520 is said to be 59 feet. The swing lock is of the positive-gear-segment type and will engage at any point in the turntable gear. It is hand-operated from within the cab. The 1520 has a single-disk engine clutch and double-disk operating clutches. The drive axle is a tandem dual drive with walking beam and has eight 10:00 x 20 tires. The steering axle is of the oscillating type and has four 10:00 x 20 tires. The 6-wheel brakes are air-actuated. The boom hoist has an enclosed worm-gear drive which runs in a bath of oil. It is provided with a spring-loaded safety brake.

Further information may be secured from the company, or by using the enclosed Request Card. Circle No. 118.

Equipment Line Listed In Road Show Broadside

A large broadside which shows the complete Jaeger line of equipment as exhibited at the Road Show in July has been prepared for distribution by The Jaeger Machine Co., 550 W. Spring St., Columbus 16, Ohio. Among the items listed in Bulletin B-8 are the Jaeger Type X diagonal-screed finisher, the Model BP-5 bituminous paver, the Jaeger truck pavers with concrete spreaders, a complete line of pumps and air compressors in a wide range of capacities and styles, the two-speed all-steel Hydro-Hoists, the Speedline mixers, and the Jaeger truck-mixers.

Copies of this literature may be obtained from the company. Or use the enclosed Request Card. Circle No. 56.

Rotary Snow Plows

Perhaps it is hard even to think of snow and cold weather now but a well planned snow-removal program should get under way now if it is to be in operation when needed. For those who are taking stock of equipment inventories, a catalog on rotary snow plows is now being distributed by the Roto Wing Co. of Shakopee, Minn.

This bulletin stresses the use of Roto Wings in snow-removal work. It describes the Roto Wing, points out its special application, explains how it removes snow banks from the shoulder of the road to beyond the ditch line while the propelling vehicle remains on the road, and also describes other features of the plow. The final page of the bulletin shows the Roto Wing application for mounting on a Caterpillar No. 12 motor grader thus affording the owner twelve months' use of the propelling vehicle.

Copies of this literature may be obtained from the company. Or use the enclosed Request Card. Circle No. 77.

The average hauling job for one freight car is reported to take 12½ days. The reduction of one day would be the equivalent of adding more than 100,000 freight cars to the present available supply.

Bituminous Heater

A heater for bituminous materials is manufactured by Hy-Way Machinery, Inc., 3697 Oakwood Ave., Youngstown 9, Ohio. It is said to operate at less than 1½ pounds of heater pressure, and to maintain sufficient temperature to handle and store 50,000 gallons of 60 to 70-penetration asphalt, while permitting the withdrawal from storage of 1,500 gph of material at 275 degrees F.

The Hy-Way heater uses hot oil as the heat-exchange medium. This allows the installation of an automatic temperature control on the storage tanks and kettles. Complete automatic fuel-oil burners are standard equipment. The centrifugal pump has sufficient capacity to circulate the oil and to maintain a line distribution pressure of 20 pounds, the manufacturer points out. The unit is 8 feet wide, 16 feet long, and 10 feet high. Shipping weight is 7,000 pounds.

Further information may be secured from the company, or by using the enclosed Request Card. Circle No. 20.

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No time is lost for periodic stripping down. The flexible shaft can be lubricated in less than 20 seconds. *The Vibrator Head Runs Dry.* No clamping or screwing needed at the power source.

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4 CYCLE BRIGGS & STRATTON GASOLINE ENGINES
Preferred Power FOR INDUSTRIAL CONSTRUCTION RAILROAD AND FARM EQUIPMENT

How to Combine Equipment For Low-Cost Road-Mixing

Blade Graders, Tillers, Drags, Harrows, Do Good Job When Properly Used; Are Readily Available

+LOW-COST road-mixing can be done efficiently without a considerable capital investment for specialized equipment, highway men were reminded at the January ARBA meeting in Washington. J. Eldridge Wood, Materials Engineer of the Maryland State Roads Commission, reviewed for his listeners what he called the simple and homely tools that have proved satisfactory in preparing, applying, and finishing low-cost soil-bituminous road-mixes—tools already in the possession of the highway maintenance organization, road contractor, or available for hire from local farmers.

Blade Graders

The first of these tools is the blade grader, he pointed out—the only device that can completely mix a job without the aid of other equipment. It seems to give a more intimate coating of bituminous material to the individual particle. It is the only piece of equipment suited to pass a windrow of material from side to side of the road, or from the road to the shoulder. It is indispensable in the smoothing or finishing operation so necessary for a good riding job. It is also an effective tool for aerating. And, finally, the scarifying unit which is usually a part of the modern road machine is the most efficient used for this work. The machine is fast, flexible, and will always be found where soil or low-cost roads are in process of construction. It is unnecessary to point out the merits of blade graders, said Mr. Wood, or convince anyone of their place on work of this type. For whatever specialized mixing machine is used, irrespective of cost, a blade grader must be there to finish the job.

Rotary Tillers

The rotary tiller gives good depth control, good deep mixing, good pulverizing, and is an excellent tool for aerating. It is fast, and in recent years has become readily available on a rental basis. It is so efficient that the Maryland State Roads Commission could not afford to do without it on a project of any magnitude, said Mr. Wood. He reported, however, that on most soils the Commission has found it desirable to supplement mixing by the rotary tiller with passes of the blade grader, to break up small balls ½ to 1 inch in diameter made up of a fat asphalt-soil mixture surrounded by uncoated soil particles.

Multi-Blade Drags

Drags of many types and weights have been found quite useful in road-mix operations, but their use is limited to shallow depths only. The long-wheelbase types produce good riding surface. They provide a good finishing mulch. And they perform well immediately behind the distributor to provide a fat mix which later can easily be dispersed throughout the total depth by other deeper-operating equipment.

Disk Harrows

Because low-cost roads are built in rural areas, disk harrows are readily available, Mr. Wood pointed out. He expressed a preference for the 24-inch unit over the smaller farm type, and recommended using one or two in the mixing operation. In sands their work is more effective than in material with a significant plasticity index, he went on to say. They are especially useful to cut in the bitumen behind the distributor, to get depth, to deep-mix, to aerate; and they are indispensable when it is necessary to cut up bituminous mixtures that have compacted and need reworking. The only disadvantage of this unit is that when it is used behind the distributor it sometimes makes hand-size sandwiches of asphalt covered on each side with unmixed soil, which under some conditions are difficult to break up.

Other Tools

The spring-tooth harrow, another readily available farm tool, works best in light soil, is not very good for mixing, but is effective for aerating.

The orchard cultivator is similar to the spring-tooth harrow but heavier. Mr. Wood praised it as a sound implement for deep mixing, for maintaining depth control, and for aerating. But he pointed out that it is not as easy to find in an agricultural community as the tools previously mentioned.

The multiple-bottom plow is seldom used, and does not have merit as a mixer. The main application Mr. Wood cited for it was obtaining accurate depth control when used as a supplement to scarifying.

Equipment Combinations

Mr. Wood then asked his audience to picture a small job, an intersection, a turnaround, or the reworking of a short section improperly placed. Minimum equipment might consist of a blade grader with scarifier. The unit could do the pulverizing; then, after bituminous material was added and excessive moisture eliminated, it could rework the material and condition it for rolling.

If several days were allowed for the work, this same unit could be used even if the sections were increased in length to ½ or 1 mile—though an additional machine would obviously expedite the operation.

Other equipment could be added as the size of the project increased—a

(Concluded on next page)

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Types of Equipment For Road-Mix Jobs

(*Continued from preceding page*)

rotary tiller if practical; disk and spring-tooth harrows if they could be rented from a near-by source; and finally a multi-blade drag as a profitable supplement to the tools already named. Units could be added with little consideration of balance as long as the blade-machine relationship was adequate to scarify, control by shaping, and provide finish shaping of the work of the other units.

Methods of Operation

While many prefer to scarify, mix, and put away by rolling a given section of road each day, this method is not always followed. Many successful operations have been observed where three or four sections are in various stages of construction and are worked in this manner so as to use the equipment to the best advantage. Indeed, one of the best Maryland contractors, said Mr. Wood, usually cuts the bituminous material into a considerable length of highway, frequently the whole project, and then concentrates on mixing and finishing the job, free from the interruptions of bituminous deliveries.

On depths greater than 4 inches it is frequently advisable to mix in two operations. One method could be termed "mixing from the top down". This consists of scarifying; briefly mixing the bituminous material with the top-half depth; blading it to the shoulder; scarifying, mixing, and compacting the bottom; and then returning the top half of the shoulder to the road, completing the mix, giving it the final finish, and then compacting.

Or it is possible to mix from the bottom up. In this case, the top material is scarified and bladed to the shoulder; the bottom is mixed and compacted; and the top that has been stored on the shoulder is returned to the road, mixed, and compacted.

The rate of bitumen application depends partly on the supply, said Mr. Wood. For instance, small frequent loads lend themselves to light applications, while large infrequent loads are usually applied at a heavy rate. The usual application is less than ½ gallon per square yard. Mr. Wood expressed a preference for ¼ gallon but pointed out that many operators use as much as 0.65. With a rotary tiller, he said, as much as a gallon can be applied at a time.

After the bituminous material has been applied, a soaking-in period on granular soils seems to save some mixing. With well pulverized material the multi-blade drag works well behind the distributor. It creates a shallow fat mix that the heavy mixing equipment can easily dilute and mix further with the other material. The usual practice is to use a disk harrow for this work, but Mr. Wood recommended the drag operation because of the sandwiches of asphalt and unmixed soil which the disk harrow sometimes produces.

The application of bitumen can be continued this way, until all of it has been applied for the depth specified.

Blade graders can then mix the bitumen and soil by passing a windrow from side to side. Harrows may supplement the blades by working the material when not windrowed. Or the fastest method is to use the rotary tiller until the bitumen is well dispersed for the operation of windrowing by blade graders. With the mix completed, the material is usually windrowed, and the blade grader cuts from this windrow material to spread not more than a 2-inch depth across the road for rolling. The windrow is then moved to the opposite side and this operation repeated until the finished surface is obtained.

In some instances it is desirable to have a higher asphalt content in the surface. The last increment of material, equivalent to 1 to 2 inches of surfacing, is spread loosely over about one-half the width in the center of the road, given this last additional application of bitumen, thoroughly mixed by the multi-blade drag or blade grader, then spread and rolled.

Conclusion

With teamwork, good management, and attention to detail, Mr. Wood said in conclusion, road-mixes can be accomplished with equipment usually found in possession of the highway maintenance organization or the average road contractor and sometimes supplemented with agricultural implements.

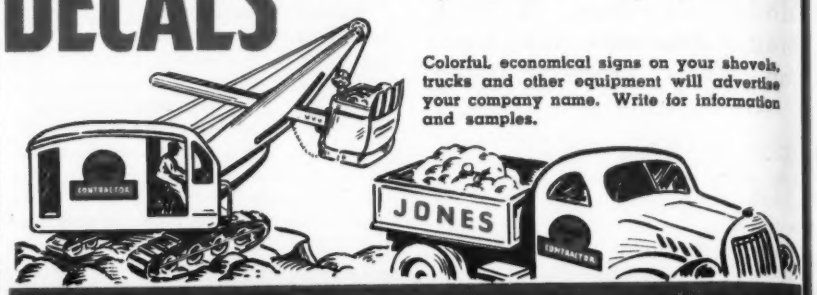
There are several good mixers designed for road-mixing in a single operation. They represent a considerable investment, and they do an excellent job. However, no one need hesitate to make use of the methods outlined if he investigates the many miles mixed with these simple and homely tools. Bases of high quality and low cost can be produced by either method.

Anniversary Booklet

A 16-page illustrated booklet, "The Huber Story", has been prepared by The Huber Mfg. Co. of Marion, Ohio, to mark the company's 85th anniversary year. It presents the company's history and a picture tour of the plant and site.

Copies of this literature may be obtained from the company. Or use the enclosed Request Card. Circle No. 64.

DECALS *Identify Your Equipment!*



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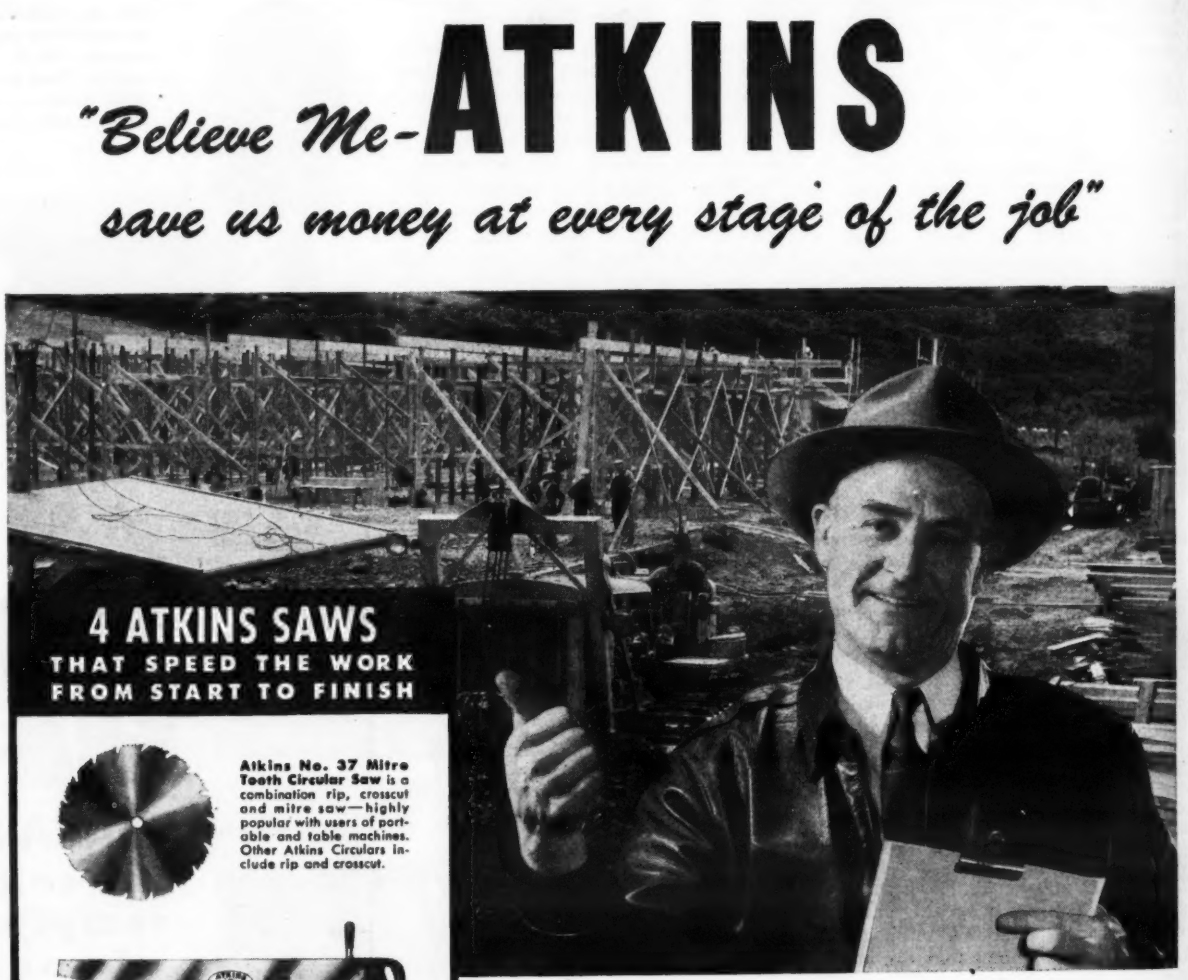
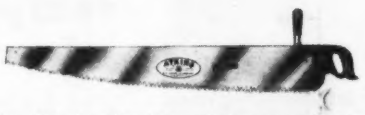
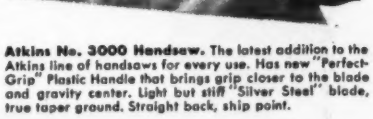


4 ATKINS SAWS THAT SPEED THE WORK FROM START TO FINISH

Atkins No. 37 Mitre Tooth Circular Saw is a combination rip, crosscut and mitre saw—highly popular with users of portable and table machines. Other Atkins Circulars include rip and crosscut.



No. 390 One-Man Crosscut. Taper ground, clears easily, runs fast. Tuttle tooth, straight back blade is hardened and tempered. Needs very little set. Hardwood handle with large grip. Filed and set, ready for use.



Atkins No. 3000 Handsaw. The latest addition to the Atkins line of handsaws for every use. Has new "Perfect-Grip" Plastic Handle that brings grip closer to the blade and gravity center. Light but stiff "Silver Steel" blade, true taper ground. Straight back, skip point.

Atkins No. 10 Easy Grip Hack Saw Frame. Black rubber handle gives complete control of the stroke, protects hands. Cold-rolled rust-resisting steel frame adjustable 8 to 12 inches. Atkins "Blue End" Hacksaw Blades are tough, fast-cutting, long-lasting.

Yes, it's true; Atkins Saws keep construction sawing costs where they belong — down at sub-basement level.

For every sawing job there's a particular Atkins Saw that cuts faster, easier, cleaner — that represents all the skill, knowledge and improvement gained in 92 years of saw-making experience. Because of the characteristics of Atkins "Silver Steel", these saws stay sharp longer and last longer. When the pressure is on and the backlog high, you can count upon those extra-keen teeth to keep cutting smoothly for record periods. All this adds up to these important factors on your ledger sheets: lower labor costs, less time out for sharpening, greater cutting output.

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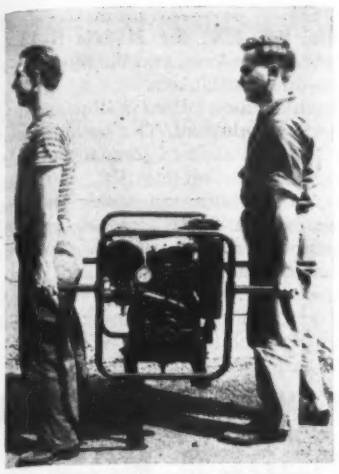

The Hale Model F22 centrifugal pump can be carried about by two men. Its capacity is 60 gpm at 90 psi, or 150 gpm at 30 psi.

New Centrifugal Pump

A self-powered centrifugal pumping unit is manufactured by the Hale Fire Pump Co., Conshohocken, Pa. The company recommends it for high-pressure washing, pumping water from excavations, emptying or filling tanks or tank cars, well sinking, and other types of construction work, as well as for emergency fire equipment. Capacity of the Model FZZ is 60 gpm at 90 psi; and 150 gpm at 30 psi.

This single-stage centrifugal pump is powered by a 7.7-hp 4-cycle air-cooled Briggs & Stratton gasoline engine. It features the Hale ejector priming system designed to eliminate hand priming, clutches, or gears. It is made with three types of mount—hand-carrying frame, barrow-type carriage with pneumatic tires, or stationary mounting.

Further information may be secured from the company, or by using the enclosed Request Card. Circle No. 36.

Mobile Sinker Drill

A mobile sinker drill for Mud-Jack work and other shallow-hole drilling is available from the Le Roi Co., 1706 S. 68th St., Milwaukee 14, Wis. The Model No. 105 Trac-Jac attachment is used in conjunction with the Le Roi Model No. 105 Tractair.

Standard equipment includes a Le Roi-Cleveland dry-type Model HC10R drill with a 24-inch steel change, mounted on a pneumatic reverse-feed mechanism. This unit is clamped to a rigid column and bracket on the Tractair. The drill is furnished standard with a 1 x 4¼-inch chuck, and will accommodate bits of up to 2⅝-inch maximum diameter. The drill requires an air pressure of from 70 to 80 pounds. The attachment weighs 350 pounds.

Further information may be secured from the company, or by using the enclosed Request Card. Circle No. 114.

G-E Service in Mass. Plant

Direct sales and service facilities for G-E arc welders, electrodes, and welding accessories are now available to industry at General Electric's Fitchburg, Mass., plant. The new service is under the direction of Roger W. Wenzel, who was recently appointed Sales Representative of the Welding Equipment Divisions for central and western Massachusetts and the states of Maine, Vermont, and New Hampshire.

Chapman Chemical Moves

The Chapman Chemical Co. announces that its offices have been moved to 707 Dermon Bldg., Memphis 3, Tenn. Administrative and research activities formerly handled from Chicago and New Orleans will now be consolidated at the Memphis office, although sales offices will continue in these two cities. Chapman makes a line of wood-preservative chemicals including pentachlorophenol, adopted as a tentative standard by the American Wood-Preservers' Association.

Snow-Fighting Equipment

Eight pages of information on snow-fighting equipment make up the new catalog now being distributed by the Klauer Mfg. Co. of Dubuque, Iowa. Featured in Catalog No. 461 are three Snogos—the Model TU for mounting on heavy-duty 4-wheel-drive trucks; the Model LMU for mounting on medium-duty 4-wheel-drive trucks; and the Model LTR for mounting on lighter 4-wheel-drive trucks.

The catalog contains many photographs of the Snogo at work in all types of snow-fighting operations and in all types of snow—wet, dry, drifted, hard-packed, etc. It also describes and explains fully the special features of the unit.

Copies of this literature may be obtained from the company. Or use the enclosed Request Card. Circle No. 43.

Oakite Makes it Easy to Descale Water-Cooled Compressors

JACKETS of water-cooled air or gas compressors should be cleaned at frequent intervals to assure proper heat transfer. Here's how: First, remove muck, sludge and similar deposits. These obstructions are easily removed by pump-circulating a recommended solution of Oakite Penetrant through system.

Next, introduce a solution of Oakite Compound No. 32. Permit to soak, or pump-circulate solution through jackets for recommended time. This inhibited acidic type Oakite descalant thoroughly loosens scale and rust for easy removal by rinse, without damaging metal. Neutralizing and rinsing complete the job. Your local Oakite Technical Service Representative will help you get started on all your descaling jobs. Drop him a line or send for Oakite Data Sheet F6420 which gives facts about descaling and other Diesel maintenance-cleaning jobs. No obligation for either service.

OAKITE PRODUCTS, INC.
72 Thames St., NEW YORK 6, N. Y.
Technical Service Representatives Located in Principal Cities of United States and Canada

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1878 - 1948

99-H

The Power Grader that has Everything

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Austin-Western, builder of the world's first Road Grader, in 1878, is proud to present "The Power Grader That Has Everything." Everything, including exclusive All-Wheel Drive, All-Wheel Steer, Controlled Traction, and Precision Sideshift, PLUS High-Lift Blade, Extreme Blade Reach, and Completely Reversible Blade, and a full line of time- and money-saving attachments.

The "99-H" pays maximum dividends day in and day out, year in and year out. No other machine will do *so many* highway construction and maintenance jobs *so well*. Your nearby Austin-Western distributor will be glad to tell you the whole story.

AUSTIN-WESTERN COMPANY, AURORA, ILLINOIS, U.S.A.

Austin Western
FUNDADA 1859

"By the by, Joe, just where did you pick up this load of sand?"

New Tandem Rollers With Variable Weight

Tandem rollers in two models have been announced by the Shaw Sales & Service Co., 5100 Anaheim-Telegraph Road, Los Angeles 22, Calif. The new Sealcoat rollers are available in 3 to 5 and 5 to 8-ton models. They are especially recommended by Shaw for working along curb lines and in confined spaces, as well as in the open.

The 3 to 5-ton model is powered by an Allis-Chalmers Model B gasoline engine rated at 27.8 brake horsepower at 1,800 rpm. The transmission provides two speeds forward of 1.55 and 2.55 mph, and two in reverse of 2.75 and 4.00 mph. The compaction roller has a 38-inch width and a 40-inch diameter; the steering roller, a 38-inch width and a 30-inch diameter. Compression of the compaction roller per linear inch with ballast is 155 pounds; without ballast, 105 pounds. For the steering roller, compaction is 75 pounds with ballast and 50 pounds without. The unit has a gravity-type sprinkler, a 91-inch wheelbase, a 132-inch length, and a 43-inch width. According to the manufacturer, this roller can be used within 1½ inches of a curb or building.

The 5 to 8-ton model is powered by a Chrysler gasoline engine with fluid coupling, rated at 57 hp at 1,600 rpm. The Brown-Lipe transmission provides three speeds forward of up to 4.15 mph, and three in reverse. The compaction roller has a 50-inch width and a 53-inch diameter; the steering roller, a 50-inch width and a 40-inch diameter. Compression of the compaction roller is 225 pounds per linear inch with ballast and 145 pounds without. For the steering roller, it is 125 pounds with ballast and 100 pounds without. The unit has a gravity-type sprinkler, a 10-foot 1-inch wheelbase, a 14-foot 4-inch length, and a 4-foot 8-inch width. According to the manufacturer, this roller also can be used within 1½ inches of a curb or building. Both models are equipped with an electric starter, single-lever hydraulic steering, and other mechanical features.

Further information may be secured from the company, or by using the enclosed Request Card. Circle No. 48.

Winch for Tractors

A single-drum winch for industrial wheel-type tractors was among the items introduced at the Road Show in July by the American Hoist & Derrick Co., Robert and Water Sts., St. Paul 1, Minn. The Model No. 128 Tractowinch is rated at a 7,500-pound single-line pull at 100 fpm on the first layer of cable; and 3,750 pounds at 200 fpm with a full drum. These ratings are based on a power input of 27 hp at 600 rpm.

Rope capacity of the Tractowinch is 350 feet of working length and 500 feet of storage length with ⅜-inch rope; 200 feet of working length and 275 feet of storage length with ½-inch rope; and proportional lengths with other sizes — assuming perfect spooling of cable on the drum. The drum of the winch is 5 inches in diameter and 8 inches long, and it has a 13¼-inch flange diameter.

The winch is driven by a power take-off on the tractor shaft, and is controlled by a jaw-clutch lever located by the operator's seat. It can be locked in the engaged or disengaged position. A 6-inch sheave can be provided as extra equipment to allow the cable to lead out at a lower level either to the front or rear of the tractor.

Further information may be secured from the company, or by using the enclosed Request Card. Circle No. 24.

Light-Holding Fixtures

Brackets for holding light fixtures on machines or workbenches are made by the Detroit Industrial Products Co., 8827 Strathmoor Ave., Detroit 28, Mich. This line of shop lights is designed to meet a wide range of garage and bench applications, and literature describing it is now being distributed by the company.

Printed as separate data sheets for insertion in a loose-leaf folder or standard stock catalog, they cover the various features and applications of the line. One sheet describes a heavy-duty portable shop light for use in automotive repairs and lubrication; another covers the industrial machine and bench lights; and a third describes the Garage-Man junior shop light for specialized lighting of garage-service work.

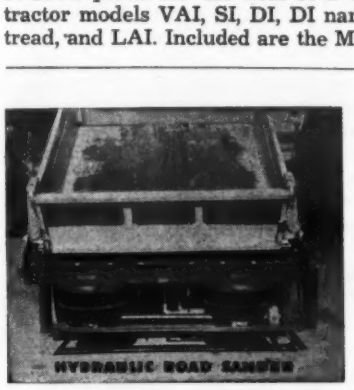
Copies of this literature may be obtained from the company. Or use the enclosed Request Card. Circle No. 71.

Timely Data on Snow Plows

A catalog of special significance now that winter is near again is one put out by the Anderson Engineering Co., 225 Bent St., Cambridge 41, Mass. Bulletin No. 202-C describes the Anderson line of snow plows for use with J. I. Case tractor models VAI, SI, DI, DI narrow tread, and LAI. Included are the Model No. SW-37 one-way plow, the V-type Model SW-38V, the Models R-42 and S reversible plows, and the Model B-100 light-duty bulldozers.

Each of these plows is illustrated and described in detail. The catalog covers the features claimed for each unit, and contains a complete list of specifications for both the mold board and push frames. It tells which model of tractor each unit will fit, and also describes their recommended uses.

Copies of this literature may be obtained from the company. Or use the enclosed Request Card. Circle No. 31.



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√ Controlled Density
√ Controlled Direction

City, county and state highway departments use Hydro Spreaders because they provide the safe, sure way of spreading icy streets and roads. Easily installed on any dump truck with hydraulic hoist.

Material can be spread from 9 ft. to 35 ft. at speeds up to 30 m.p.h. All sprockets and chains are fully enclosed and material can be dumped over spreader without damage. One man can drive truck and operate spreader from cab.

An exclusive Hydro Spreader feature is the automatic gate opening device. When the driver starts the spreader the gates open and as the spreader is stopped the gates automatically close. There is no waste of material when spreader is not in operation. Hydraulic Spreaders are guaranteed to be free from defects in either materials or workmanship. Immediate delivery.

Write for illustrated folder. *Dealer territory available.*

Paul M. Cole Company, National Distributor, 30 N. La Salle St., Chicago, Ill.

Hydro Spreader Corp. 247 Madison Street Waukesha, Wisconsin

Once you see this marvelous new Concrete CON-VAY-IT Special in use, you'll certainly want one. Because you'll marvel at seeing it pour about 5 times as much concrete as by the old wheelbarrow method, in the same space of time. Learn how this *amazing new conveyor* will add to your construction profits — write *TODAY* for particulars.

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UP with the OWEN loader

DOWN with Material Handling COSTS!

Owen Overhead Loader on the mobile Case 'DI' tractor modified for loader installation. Bucket is in lowered position ready to dig or crowd into loose material.

Fast digging and loading result from the convenient operating features

Loading is fast because it is not necessary to turn the tractor . . . move forward to fill the bucket from the bank or stockpile and back to dump into the truck.
Powerful hydraulic "crowding" action and the arrangement of bucket arms and "A"-frame assure a full bucket.

Well adapted for operation over rough ground

Unusual stability results from the compact design of the loader as well as the low center of gravity and the wide rear wheel tread of the tractor.
No shocks or strains are carried to the tractor. The loader frame absorbs all the strains set up in operation.

Trucks can be loaded over the side or over the rear-end gate.

1½-yd. snow bucket and bulldozer blade available as extra equipment.
Write for specifications or see your Case Industrial Dealer.

OWEN LOADER, INC. BOX 3282, STATION "F" ATLANTA, GEORGIA

Brake-Relining Unit

Brake-relining equipment is made by the Chicago Rivet & Machine Co., 9600 W. Jackson Blvd., Bellwood, Ill. The Admiral Model E 4-station unit is described as an all-purpose brake reliner of the heavy-duty type. According to the manufacturer, it permits the relining of car and truck brakes with factory accuracy. It can be used with tubular or solid brake-lining rivets.

The head is of the multiple type; a change in tooling is not necessary when switching from de-lining to riveting operations. It is designed so that old rivets are knocked out and fall into a self-contained collector. The riveting throat is 7 inches deep. The countersink drills operate at a speed of 3,000 rpm.

The Admiral Model E is equipped with a standard ac 110-volt 60-cycle single-phase motor—with odd voltage, odd frequency, or dc motors also available. Among the features claimed for the Model E are the set-back de-liner, the low head for small-diameter bands, the drilling and grinding unit, the adjustable riveting anvil, and the adjustable pedal stop. Weight of the machine is 205 pounds. The company also manufactures a line of brake-lining rivets in several styles and sizes.

Further information may be secured from the company, or by using the enclosed Request Card. Circle No. 74.

Bituminous Distributors

Bituminous distributors are the subject of two catalogs now available from the Standard Steel Works of N. Kansas City 16, Mo. Catalog No. RS-6145 (revised) deals with the large bituminous pressure distributor, while Catalog RS-12046-V deals with the Model SJ hand-held maintenance unit.

The bulletin on the pressure distributor lists 15 features of the unit and discusses its component parts—including the fuel-circulating spray bar, the valve action, spray tips and the pattern they form, suck-back bar, and the asphalt pump. The folder also lists standard equipment supplied with the Models No. 424 and 324, weights and dimensions of each, and auxiliary equipment which is available.

The bulletin on the Model SJ describes some of the patch work and secondary-road jobs for which Standard recommends this unit. It describes the truck and trailer mountings in which it is supplied, details of construction, and auxiliary equipment. It also contains a check list for comparing this unit with other makes on the market.

Copies of this literature may be obtained from the company. Or use the enclosed Request Card. Circle No. 78.

Nat'l Carbide Elects Bode

J. Carl Bode is the new President of National Carbide Corp., succeeding L. A. Hull who has become Chairman of the Board of Directors. Mr. Bode joined the company in 1928, and most recently held the position of Operating Manager.

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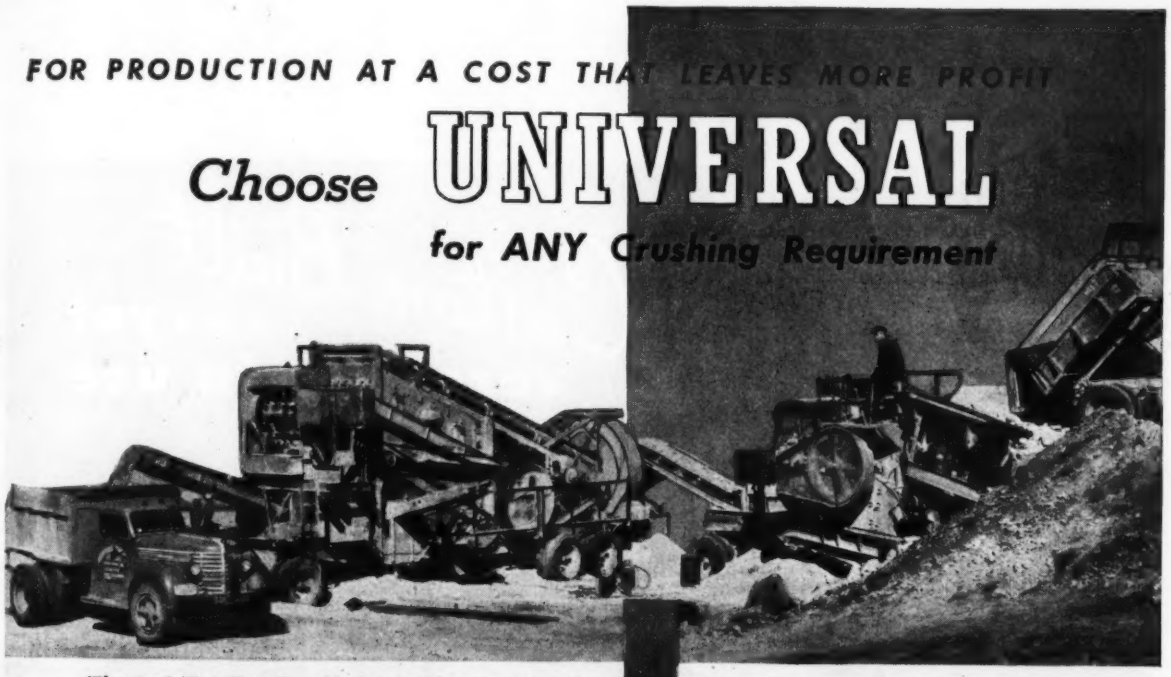

The 822-Q Two Unit Portable Quarry Plant consisting of a 546-P Primary and 800 Series Double Roll Secondary. Combines flexibility and mobility with volume production.

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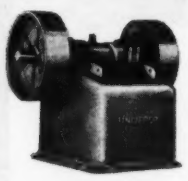

Universal overhead eccentric jaw crusher. The recognized leader of all crushing operations. Built in 4 types with plain or roller bearings. Capacities to meet every crushing need. Series "SL" illustrated.

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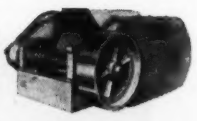

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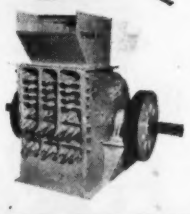
Recommended for use behind the 546-P Primary for volume production of aglime and road rock. Features the UNIVERSAL welded steel plate roller bearing pulverizer. Capacities up to 180 tons road rock and aglime per hour.



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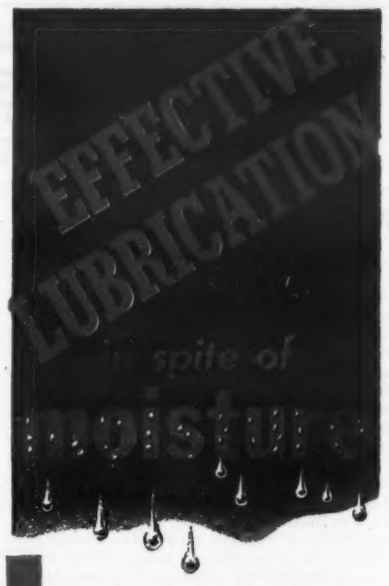

Operation of production machinery in the presence of moisture, steam and acids has always been a serious problem in many processing industries. There are a number of LUBRIPLATE lubricants that satisfactorily meet these unfavorable operating conditions, thereby protecting machine parts against rust and corrosion. Write for interesting particulars.

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Lubricants definitely reduce friction and wear to a minimum. They lower power costs and prolong the life of equipment to an infinitely greater degree. LUBRIPLATE arrests progressive wear.

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Lubricants protect machine parts against the destructive action of rust and corrosion. This feature alone puts LUBRIPLATE far out in front of conventional lubricants.

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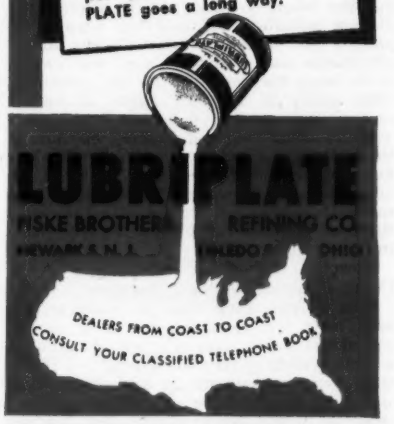
Lubricants are extremely economical for reason that they possess very long life and "stay-put" properties. A little LUBRIPLATE goes a long way.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Contractors and Engineers Monthly
470 Fourth Ave.
NEW YORK 16, N. Y.

Avoid Legal Pitfalls

Edited by A. L. H. STREET, Attorney-at-Law

These brief abstracts of court decisions may aid you. Local ordinances or state laws may alter conditions in your community. If in doubt consult your own attorney.

When Mutual Intention Contradicts a Contract

THE PROBLEM: *The Government asked for bids based on the use of alternative insulating materials which varied greatly in cost. Plaintiff's bid based on the use of the cheapest material was accepted, but the contract inadvertently failed to limit the material to that type. That type was not available in time, so the Government required plaintiffs to use costlier insulation. Was the Government liable for the additional cost?*

THE ANSWER: Yes, decided the United States Court of Claims. (Olson Construction Co. v. United States, 75 Fed. Supp. 1014.) As shown by the following extracts from the opinion, the decision turned upon the contractors' right to be relieved from inadvertence in the preparation of the contract. It rested on an assumption that there was no lack of mutual intention:

"When the invitation for bids . . . stated that the contract was not, necessarily, to be let to the lowest bidder but was to be negotiated after a study of the bids, and [when it] permitted bids to be made upon the basis of use of several materials differing greatly in cost, we think it meant that the resulting contract should require the contractor to use the one of the materials upon which the bid and the negotiated contract would be based. We think it did not mean that the Government, having made a contract upon the understanding that the costlier material would be used, would have to be satisfied with the cheaper material if the contractor repudiated the understanding and pointed to the option in the written words of the contract which had been written before the option was exercised and the contract made. Likewise we think it did not mean that the contractor would be required, without extra compensation, to furnish the costlier material, if the cheaper material became unavailable.

"The understanding and intention of the contracting officer's agents who made the contract for the Government . . . which was identical with that of the plaintiffs, is the important point in the case. When the letter of the contract, as signed, contained alternatives which, useful and rational in the negotiation stage when bids were being solicited, became obsolete and irrational as terms of a definite agreement, we think that the failure to strike out the alternatives did not indicate at all that they were to remain a part of the contract. It was an inadvertence such as honest men who expect to do what they agree to do are, probably, often guilty of. But one guilty of such a natural inadvertence does not lay himself open to being required, merely because of the letter of the writing, to perform what he has not promised. We think that, in the circumstances in which this contract was made, there is no rule of law which prevents the true agreement of the parties from having controlling effect."

However, two of the five justices of the Court dissented on these grounds:

"We do not think that the facts of this case meet the requirements of a mutual mistake of such a nature as would authorize a setting aside of its plain terms. . . . Plaintiffs were unfortunate in that they relied upon the mistaken belief that the cheaper material would be available, but the defendant made no such guarantee. The plaintiffs obligated themselves to do certain work within a specified time with one of three different kinds of material. They did the work with one of the materials . . . and they have been paid the price stipulated in the written agreement."

Dormant Joint-Venture Contractors Held Liable

THE PROBLEM: *The Macris, partners, took a Government construction contract. They gave a surety bond for performance and agreed to indemnify the surety company for liabilities incurred through executing the bond. Four days later the Macris formed a partnership or joint venture with Goerig and Philp, to carry out the construction contract.*

The next year the joint adventurers took a similar contract and agreed to indemnify the surety company similarly. Shortly thereafter the joint venture was dissolved, Goerig and Philp agreeing to pay the Macris a percentage of their losses in carrying out the construction contracts. The surety company became liable to a materialman to whom the Macris still later had become liable. Did Goerig and Philp become liable to the surety company for reimbursement of the company's loss?

THE ANSWER: Yes, decided the United States Circuit Court of Appeals, Ninth Circuit. (Goerig v. Continental Casualty Co., 167 Fed. 2d 930.)

The court decided that by participating in the joint venture, Goerig and Philp bound themselves with the Macris to indemnify the surety company, even if the company did not at first know of Goerig's and Philp's relationship with the Macris. Nor was the liability avoided because Goerig and Philp withdrew from the venture before the Macris defaulted in their obligation to the materialman.

Government Contractor's Right Because of Delay

THE PROBLEM: *The contractor on a Government housing project was delayed when a city required a plumbing subcontractor to suspend operations until a municipal permit should be secured. The Government sued to enjoin the municipal interference, and it required the general contractor to proceed without the plumbing first being installed. Was the contractor entitled to damages from the Government on a theory that it broke an implied agreement not to require*

(Concluded on next page)

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All Rodgers presses are built under expert care and strict supervision. All units are guaranteed to withstand or produce the pressure that they were designed and advertised to perform.
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Portable Presses

Avoid Legal Pitfalls

(Continued from preceding page)

the contractor to proceed in an unusual manner?

THE ANSWER: No, decided the United States District Court, Eastern District of Pennsylvania. (George H. Evans & Co. v. United States, 74 Fed. Supp. 58.)

The court said it was true that the Government impliedly agreed not to hinder the contractor in performing its contract nor to increase the cost of performance. "But the converse is not true, and the Government is not necessarily liable every time it directly or indirectly increases the costs or decreases the profit of a party contracting with it . . . This is not a case where a contractor's increased expense was caused by faulty plans and specifications." The court said that the Government acted properly under the Lanham Act, in disregard of attempted municipal interference.

Clause Added to Contract Contradicts Earlier One

THE PROBLEM: *Plaintiff was successful bidder for a subcontract on a Federal ordnance-plant project. Before the contract was signed, plaintiff insisted that a clause be added making the defendant contractor liable for late delivery of materials. That clause contradicted a preceding clause. Could plaintiff enforce the added clause?*

THE ANSWER: Yes, decided the United States District Court, Northern District of California. (Power Service Corp. v. Joslin, 76 Fed. Supp. 604.) Here is the gist of the court's opinion:

The clause was added with the approval of all parties concerned. Acceptance of the bid did not create a contract and therefore leave the added clause without consideration to support it. There was no binding contract until it was signed, because that was contemplated when the bid was made and accepted.

Although a contract must be read in its entirety, effect will be given to manifest intention of both parties that an added clause is to supersede a preceding clause. This is especially true when the added clause is written in and the superseded clause is printed.

However, the subcontractor had accepted payment from the contractor as being in full, excepting a claim for damages theretofore filed by the plaintiff subcontractor. So the court decided that plaintiff could not collect damages in excess of the amount demanded in that claim.

Plaintiffs Lose Some Cattle When Road Fence Removed

THE PROBLEM: *Was a state highway contractor liable in damages for removing a fence along the boundary of a road under construction, and for resulting loss of cattle being pastured on the land which was thus thrown open?*

THE ANSWER: Yes, decided the Florida Supreme Court. But it was up to the owners of the cattle to show the number and value of cattle lost or destroyed through the contractor's fault. (M. J. Carroll Contracting Co., appellant-defendant, v. Smith et al., plaintiffs-appellees, 53 So. 2d 385.)

As to defendant contractor's liability, the Supreme Court decided that he had a right to enter the land, but his contract with the state gave him "no right to destroy the fence or leave it down and expose the plaintiffs' cattle". Nor was the trespass excusable on the ground of then existing war conditions.

But, as to the amount of damages that could be awarded, the court ruled that the mere fact that the plaintiffs lost some cattle was not enough to entitle them to a verdict. They were bound to show how many animals were killed or lost through the contractor's wrongful acts, as distinguished from animals that were missing due to other causes. So, the Supreme Court set aside a judgement in favor of the plaintiffs and ordered a new trial.

Though Gov. Aid Withheld, City Liable on Sewer Job

THE PROBLEM: *A city's existing sewers were extended by a contract job. But the Federal aid the city had expected was not forthcoming, and a bond issue was impossible. Where the city retained benefits from the job, and where there was nothing to show it was without funds to pay the contract price, could it repudiate liability to the contractor because the Federal grant was not forthcoming?*

THE ANSWER: No, decided the Michigan Supreme Court. (Di Ponio v. Garden City, 30 N.W. 2d 849.) Said the court, in part:

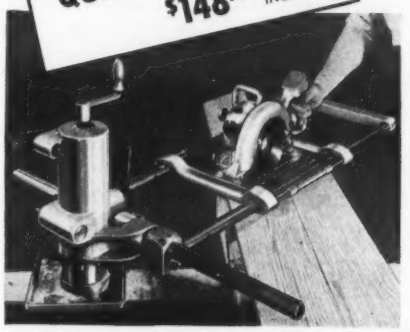
"Defendant's main difficulty is that it is not shown in any way how the city was precluded from entering into a contract to build sewer extensions, although under the home-rule act the city could not increase the rate of taxation for the expenses of running the city so as to exceed 2 per cent of the real and personal property valuation. Defendant's charter is peculiar in that it contains no limitations on the city's right to make contracts or increase its debts unless, prior thereto, appropriations and necessary funds and provision for raising these funds have been made . . . Defendant undoubtedly did rely upon a Federal grant, but in lieu thereof it cannot ask plaintiff to forfeit payment. Plaintiff should not be penalized because of defendant's delay and inaction, and final inability to issue and sell additional revenue bonds."

City Engineer Empowered To Substitute Materials

THE PROBLEM: *A municipal paving contract reserved to the city the right to make alterations found by the city engineer to be consistent with the general nature of the work. Could the engineer permit sand or loam to be used as base binding materials instead of stone screenings or gravel called for by the spex?*

THE ANSWER: Yes, decided the New Jersey Court of Errors and Appeals. (Lawrence v. Neiss, 57 Atl, 2d 505.)

NEW VAN DORN "QUICK-SAW"* ARM $148.00 (SAW NOT INCLUDED)



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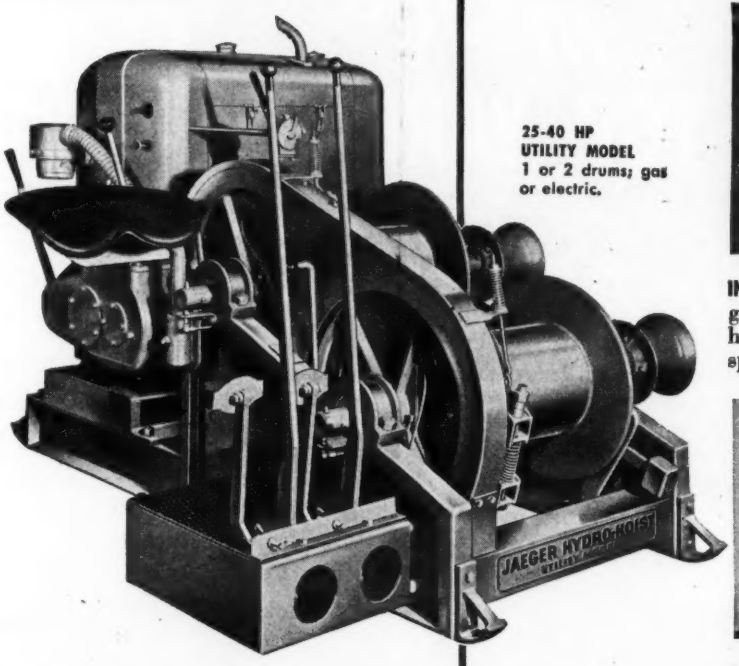

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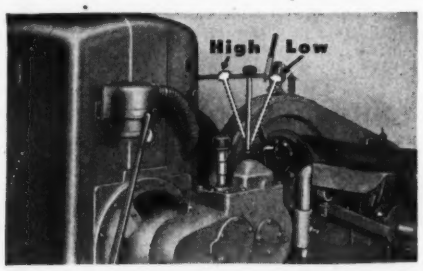

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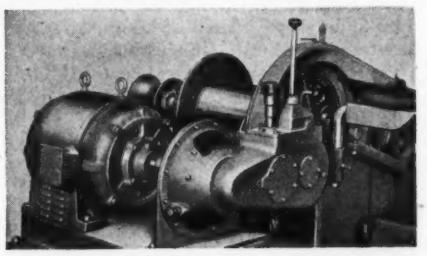

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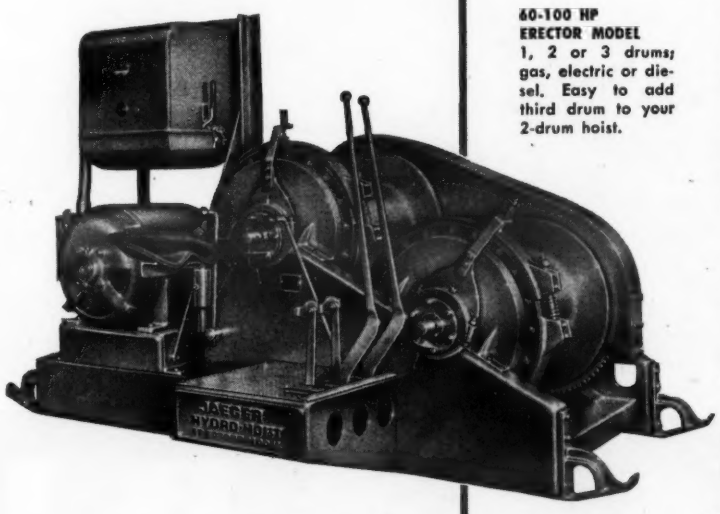

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Convention Calendar

Oct. 2-10—Construction Exposition

Construction Industries Exposition, Houston Chapter, Associated General Contractors of America, Inc. L. W. Duddlesten, General Manager, or Russell W. Nix, Chairman, Exposition Committee, AGC Office Bldg., Gray and Crawford Sts., Houston, Texas.

Oct. 4-6—Highway Exposition

New England Highway Exposition, Commonwealth Armory and Parade Grounds, Boston, Mass. John F. Cotter, Campbell-Fairbanks Expositions, Inc., 929 Park Square Bldg., Boston, Mass.

Oct. 4-7—Steel Institute Meeting

Annual meeting, American Institute of Steel Construction, Inc., Chateau Frontenac, Quebec, Canada. L. Abbett Post, Institute Executive Vice President, 101 Park Ave., New York 17, N. Y.

Oct. 13-15—ASCE Meeting

Fall meeting, American Society of Civil Engineers, Statler Hotel, Boston, Mass. Col. William N. Carey, Executive Secretary, 33 W. 39th St., New York 18, N. Y.

Oct. 19-20—Safety Congress

Construction Section meetings, National Safety Congress, National Safety Council, Hotel Stevens, Chicago, Ill. R. L. Moore, Senior Engineer, Construction Section, 20 N. Wacker Drive, Chicago 6, Ill.

Nov. 4-5—Southeastern Highway Officials

Annual meeting, Southeastern Association of State Highway Officials, Edgewater Gulf Hotel, Edgewater Park, Miss. I. W. Brown, State Manager, Highway Planning Division, Mississippi State Highway Department, Jackson, Miss.

Nov. 18-20—Highway Conference

Virginia Highway Conference, Jackson Memorial Hall, Virginia Military Institute, Lexington, Va. R. P. Ellison, Executive Assistant, Virginia Department of Highways, Richmond, Va.

Light-Duty Tractor

A light-duty wheel tractor is manufactured by the Leader Tractor Co., 3781 E. 77th St., Cleveland 5, Ohio. It is powered by a Hercules Model IXB 4-cylinder gasoline engine and develops 31 hp at 1,800 rpm. It has three forward speeds of up to 13 mph; reverse speed is up to 4 mph.

The Leader tractor has a 68¾-inch wheelbase, a 102-inch length, a 58-inch width, and a height of 61 inches. The front-wheel tread is 44 inches; the rear-wheel tread is 48¼ inches. Standard equipment includes a 1⅜-inch spline-shaft power take-off and a Zenith updraft type of carburetor. Shipping weight is listed at 2,500 pounds.

Further information may be secured from the company, or by using the enclosed Request Card. Circle No. 65.

Pile-Drivers, Extractors

Pile-driving and extracting machinery made by the Vulcan Iron Works, 327 N. Bell Ave., Chicago, Ill., is covered in a new illustrated bulletin. The line consists of the Super-Vulcan differential-acting open-type steam pile hammer, the Warrington-Vulcan single-acting type of steam pile hammer, and the Vulcan pile extractors.

Each of these is illustrated and described in the folder. Specifications are included for six models of the Super-Vulcans, 8 types of the Warrington-Vulcans, and 3 types of extractors. These specifications cover the rated striking energy, blows per minute, weight of ram, steam pressure required, weights, boiler horsepower, size of hose, and other pertinent data.

Copies of this literature may be obtained from the company. Or use the enclosed Request Card. Circle No. 80.

Foy Joins Koppers, Inc.

Fred C. Foy has accepted an appointment as Vice President and Manager of the Sales Department, Central Staff, of Koppers Co., Inc. He was formerly Vice President of the J. Walter Thompson Co. He replaces E. J. McGehee, Vice President and Sales Manager for Koppers, who has been assigned responsibility for the company's wood-preserving activities in the western half of the United States.

Grader and Sweeper Data

Folders describing several pieces of equipment in its line have been made available by the Meili-Blumberg Corp., 1615 Wisconsin, New Holstein, Wis. These include: Bulletin No. 134 on the M-B motor grader powered by an International Harvester Model M 40-hp engine; Bulletin No. 141 on the Models PG-10, M, and MD power graders powered by 40-hp gasoline or diesel engines; Bulletin No. 140 on the Model No. 30 maintainer; and Bulletin No. 139 on the MB power sweeper.

These bulletins take the form of data sheets, and point out the principal features, specifications, and dimensions of each piece of equipment.

Copies of this literature may be obtained from the company. Or use the enclosed Request Card. Circle No. 26.

Rollers in Five Sizes

A catalog on the Ingram line of rollers is being distributed by the Acme Iron Works, Box 2020, San Antonio, Texas. These are made in five sizes: the 8, 10, and 12-ton gasoline or diesel-powered units; and the 5 and 6-ton gasoline-powered units. Each of these is supplied as a constant or variable-weight unit.

Feature of the catalog is a detailed description, accompanied by pictures, of Ingram roller parts, including the transmission, rolls, frame, gasoline or diesel power units, and the front-end assembly. Also included in the catalog are several photographs of the Ingram units in use on various types of surfaces.

Copies of this literature may be obtained from the company. Or use the enclosed Request Card. Circle No. 16.

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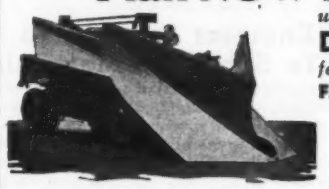

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Right now is a good time to check over your snow removal equipment. It's never too early to order new units or repairs for your present equipment. Planning well ahead of next season will enable you to avoid the inevitable snow-time rush. We'll cooperate with you in every way.

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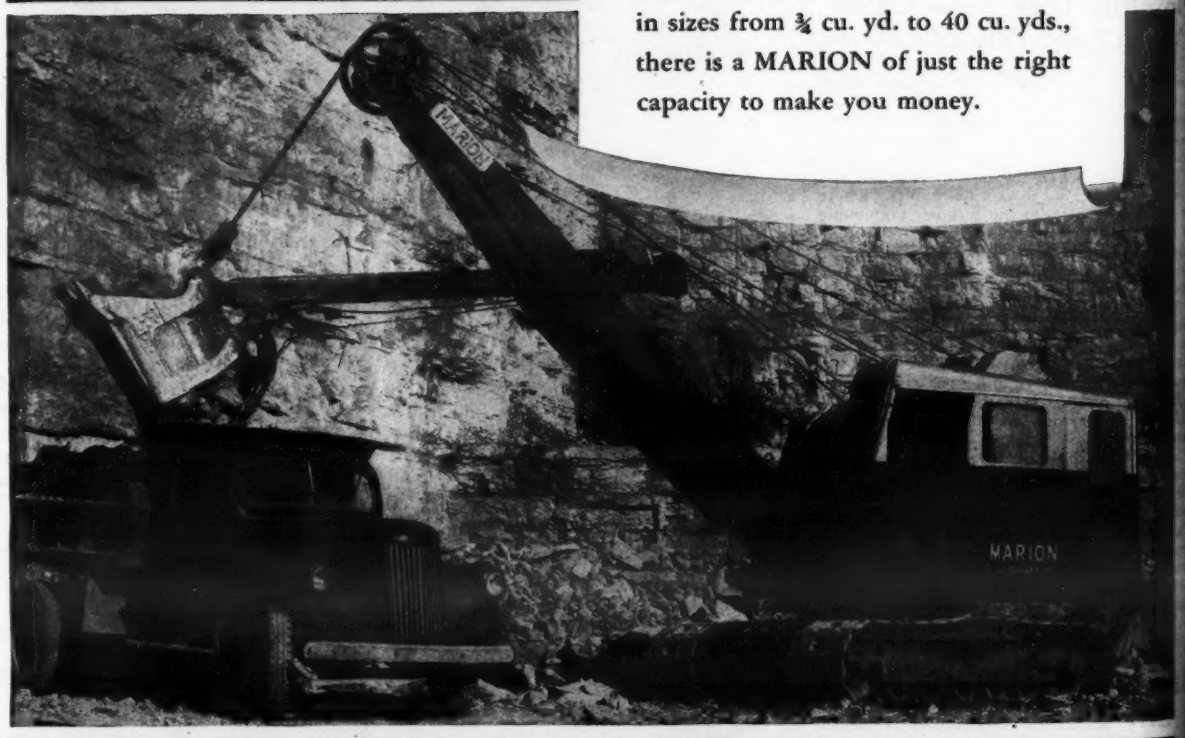
MARION means TOP YARDAGE in any going!

Want more yardage for your money? Buy MARION shovels and draglines. Here unusually sturdy construction for long life service and modern design are combined with fast operation—dependable performance and sixty years of "know how" to give you the finest machine money can buy. Built in sizes from ¾ cu. yd. to 40 cu. yds., there is a MARION of just the right capacity to make you money.



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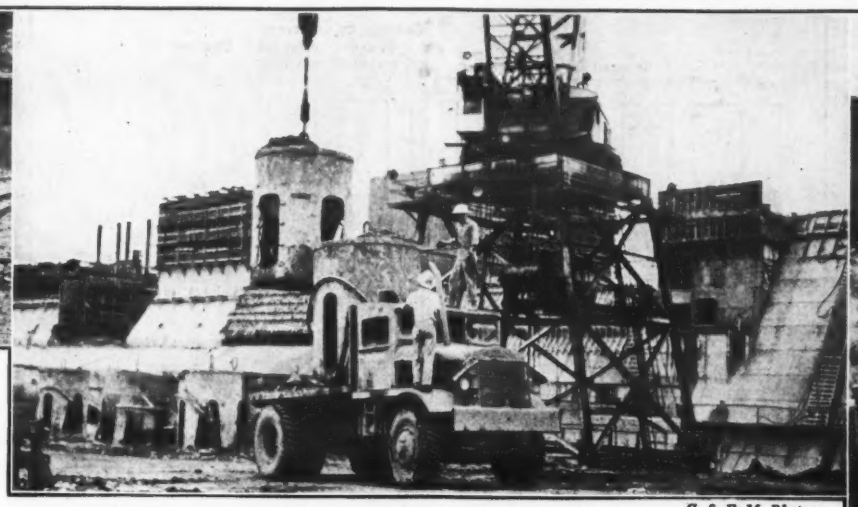

C. & E. M. Photos

Four preparations at Fort Gibson Dam include hosing clean previously placed pours with air and water (left photo). The concrete comes out to the job in 4-cubic-yard Blaw-Knox buckets on Euclid flat-rack hauling wagons (center photo). In the right-hand photo, men riding the big bucket dump the concrete in the forms. Notice the vibrator sticking out of the previously poured batch of concrete. Concrete placing on this job followed a well defined and orderly sequence.

Concreting Set-Up At Fort Gibson Dam

(Continued from page 2)

of coarse particles, this separate mechanism dumps the material in many small piles rather than in one big one, Also, when sand is transferred to the batching plant, material is pulled out of several gates at one time.

Underneath the five piles of material runs a 90-inch Armco pipe 650 feet long, tapped approximately every 25 feet by gates in the roof. These gates are all electrically operated, and a Bogen public-address system permits the tunnel attendant to keep in touch with the batching-plant operator to supply whatever size of material is needed.

All materials pass to the batching plant over a 30-inch Goodrich conveyor belt 300 feet long, rising at a grade of 18 per cent. A turn head at the top of the incline directs the materials to the proper compartments in the batch plant.

Batch-Plant Set-Up

The central mixing plant consists of a Johnson 400-cubic-yard Octobin, four Koehring 2-cubic-yard tilting mixers, an ice plant, and storage for cement and air-entraining agent.

In the Johnson 400-cubic-yard Octobin are five aggregate compartments and two cement compartments. This big plant has a fully automatic electric control system which provides the batching of five aggregates, cement, limestone dust if required, air-entraining agent, water and ice. The batch control mechanism includes recording devices for registering the weights of all materials, water temperature, consistency of each batch, mixing time for each batch, plus a time stamp which records the date, hour, and minute each batch is discharged.

The massive batching-bin structure was designed by the C. S. Johnson Co. to meet Fort Gibson specifications, and was manufactured in near-by Tulsa, Okla., by Patterson Steel Co. C. S. Johnson manufactured and supplied the balance of the equipment.

High-pressure electrically controlled rams on the gates of this big plant were designed to operate instantaneously. They were so effective, in fact, that the brackets on which these rams were mounted had to be strengthened, and the ram mounting was changed 180 degrees to make the electric control mechanism more accessible. The diameter of the ram rods was also increased from ⅝ to ¾ inch. A few spare gate rams, checked and in good operating condition, are on hand at all times. And in

(Continued on next page)

● Remember, the MultiFoote Elevating Boom has been proved in service as has no other paver boom of this type. MultiFoote Pavers with Elevating Booms handled the pouring of ammunition storage igloos during the war.

With the MultiFoote Elevating Boom you are equipped for maximum versatility. You can handle the ordinary problems of pouring slab and without making any changes handle the problems imposed by abutment work or retaining wall. In addition you are equipped to feed Pumpcrete equipment and bid on building foundation work and piers.

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Ask about the Adnun Black Top Paver, the only paver of its kind that can lay black top, stone and cinders.

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Concreting Set-Up At Fort Gibson Dam

(Continued from preceding page)

case one of the devices requires service, the changeover can be made in about 5 minutes.

Other changes, necessary for larger-sized batches of ice, included a reversal of the ice-chute arrangement and the installation of vibrators, a 10-per cent larger pipe and liner in the swivel chute, and splash boards on the top of the batch bin.

Directly below the batch bin is a large platform on which are mounted four Koehring 2-cubic-yard tilting mixers. As the materials are batched, each batch passes to one of these mixers. The order of materials passing from storage to the batch bin is as follows: ice, water, air-entraining agent, and 1½-inch maximum aggregate go in first; sand ribbons into the mix slowly, to get the best distribution; then bulk cement. When these materials are in, 3-inch-maximum and ¾-inch-maximum rock go in together. Large 6-inch cobbles enter the mix last.

After mixing 2 minutes, the materials make a 2-cubic-yard batch, which is dumped below into a wet-batch hopper. From the wet-batch hopper the concrete is dumped into 2 and 4-yard Blaw-Knox concrete buckets, set on Euclid flat-rack hauling trucks, for transportation to the dam.

Two principal types of concrete are being batched: a Class C exterior mix for the outer 5 feet of the dam, and a Class C interior concrete. Proportions for 2-yard batches are as follows:

	Class C Exterior	Class C Interior
6-inch rock	1,602 lbs.	1,700 lbs.
3-inch rock	1,398 lbs.	1,450 lbs.
1½-inch rock	1,084 lbs.	1,300 lbs.
¾-inch rock	1,000 lbs.	1,000 lbs.
Sand	1,882 lbs.	1,816 lbs.
Cement	846 lbs.	658 lbs.
Ice and water	400 lbs.	400 lbs.
Air-entraining agent	900 grams	700 grams

Limestone dust was not necessary in the mix, and the M. O. Weaver plant produced an excess of fine rock dust which had to be wasted. The 800-barrel silo originally set up to hold this material is being used for bulk-cement storage. The main storage silo for bulk cement consists of a 7,500-barrel Johnson-designed steel silo, manufactured by the Muskogee Iron Works. Bulk cement, furnished by the contractor, is currently Universal Atlas portland cement, shipped by hopper-bottom railroad cars from Independence, Kans. Screw-type feeders and bucket elevators take the material from feeder boxes under the railroad tracks to the storage bins.

Ice-Manufacturing Plant

The heart of concrete-temperature control is the ice plant and the tube-ice machines. This equipment is housed separately. Ammonia compressors and condensers are in the air-compressor shed above the batch-mixing plant on the right abutment of the dam. The three tube-ice machines are rated at 180 tons per day, and occupy a 27 x 26-foot space in a separate structure adjacent to the central mixing plant.

(In the air-compressor house are also three Class WN-31 Sullivan 1,000-cfm stationary air compressors, which furnish compressed air throughout the dam. A 6 x 20-foot surge tank and 6-inch distribution lines serve this purpose. This compressor equipment is, of course, aside and apart from ice-manufacturing equipment.)

The refrigerating equipment is made up of an Ingersoll-Rand ammonia compressor, a York compressor, and a York-Arctic Ice Machine Co. compressor. Each of these ammonia compressors is driven by an electric motor. Four 24-inch x 18-foot condensers, four ammonia receivers, three gas receivers, and three 48-inch Vogt automatic tube-ice machines round out the freezing equipment.

The three Vogt automatic tube-ice machines have a total capacity of 180 tons of ice per day. In their separate structure adjacent to the mixing plant, they are at a level permitting gravity flow of the ice into the weigh batchers of the mixing plant. Each machine has a 48-inch-diameter freezing compartment which turns out tube ice without the use of brine tanks, brine circulators, ice cans, ice fillers, dip tanks, dumpers, cranes, cubers, and crushers usually found in stationary ice plants.

A typical production cycle is relatively simple. Refrigerant, enclosed by the freezing shell, surrounds a series of vertical ice tubes. Water, pumped from a storage tank, enters a special distributing box at the top of each machine. By gravity flow, the water then trickles down the inner surfaces of the freezing tubes. Ice forms immediately, and any unfrozen water drips down to be recirculated again.

Careful adjustment of automatic controls predetermines the freezing cycle. When the insides of the tubes are coated

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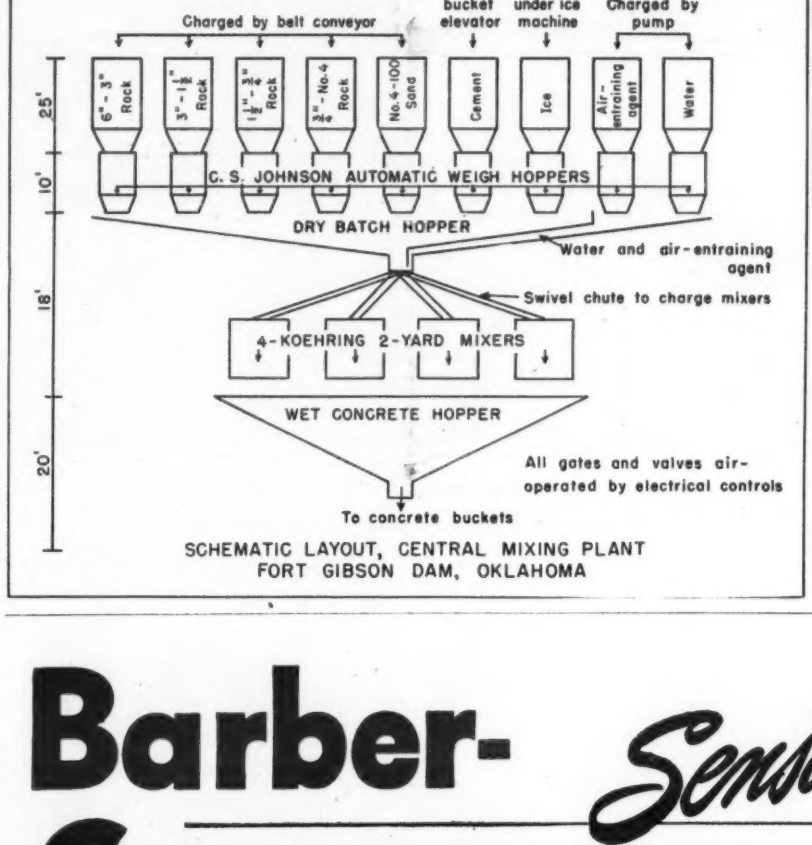

SCHEMATIC LAYOUT, CENTRAL MIXING PLANT
FORT GIBSON DAM, OKLAHOMA

Barber-Greene *Sensational*

NEW CAR UNLOADING TEAM!

unloads car of rock or crushed stone in 45 minutes

B-G HOPPER CAR UNLOADER

Here's a rugged all-material unloader that's completely new in design. The 358 cuts hopper car unloading time as much as 90%—unloads most any bulk product from fine sandy material to large-sized rock aggregates at capacities up to 3 tons per minute—empties a 60-ton car in as little as 45 minutes without jam-ups or delays. There's *positive material flow at all times.* Easily "spotted" in track pit or above rails—really portable—can be towed at normal traffic speeds.

B-G PORTABLE CONVEYOR

The newly designed B-G Model 363 Portable Conveyor is an extremely flexible machine that will prove to be profitable to yards, industrial plants, contractors, etc. Speeds up stockpiling or transfer of material from car or stock pile to trucks. Entirely new in design, the 363 features V belt drives, pneumatic tires, shock absorbers, towing hitch, and a host of new improvements. Send for new attractive literature on these two great B-G machines.

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C. & E. M. Photos

Left to right in the first photo are Johnson-Winston-Kiewit personnel at Fort Gibson Dam: pump tender Raleigh Hughes, General Superintendent "Big Al" Johnson, Master Mechanic Joe Daugherty, and Project Engineer Harlo Haagenson. Second photo: concrete form work, partly finished monoliths, and a gantry-mounted American Revolver crane at right.

with about ½ inch of ice, the ice shells are then ready to be discharged, broken up, and stored. When the freezing period stops, water is admitted to a thawing chamber beneath the freezing chamber. High-pressure gas from the condenser replaces the refrigerant in the shell. Consequent thawing occurs, and the loosened tube of ice drops down to rotary motor-driven cutters, where it is reduced to fine size. It then passes to storage in a 60-ton bin which feeds the batch plant.

Throughout summer weather, concrete-pouring operations are usually carried forward 16 hours per day on the swing and graveyard shifts. Ice is produced and stored throughout the day to stay ahead of requirements when mixing begins.

Concrete Form Work

All concrete forms for the dam were made on the job by crews of the general contractor. In general, the big monoliths are brought up in 5-foot lifts, although each block starts off with four 2½-foot lifts from the dam foundation. There is also a contract provision which specifies four 2½-foot lifts if any previous pour is not covered by a subsequent pour within 15 days.

Cantilever forms are used generally. Abutment monoliths are 40 feet long, intake monoliths are 53 feet long, and spillway monoliths are 50 feet long. The forms are made and handled in panels about 25 feet long. Structural-steel channels, 7 inches and 9.8 pounds each, spaced on 36-inch centers, serve as studs in these forms. On one side of the

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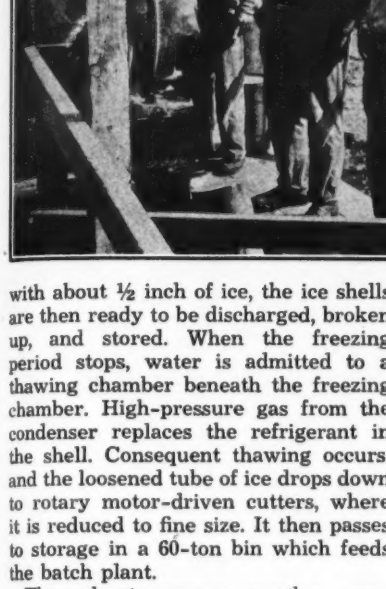

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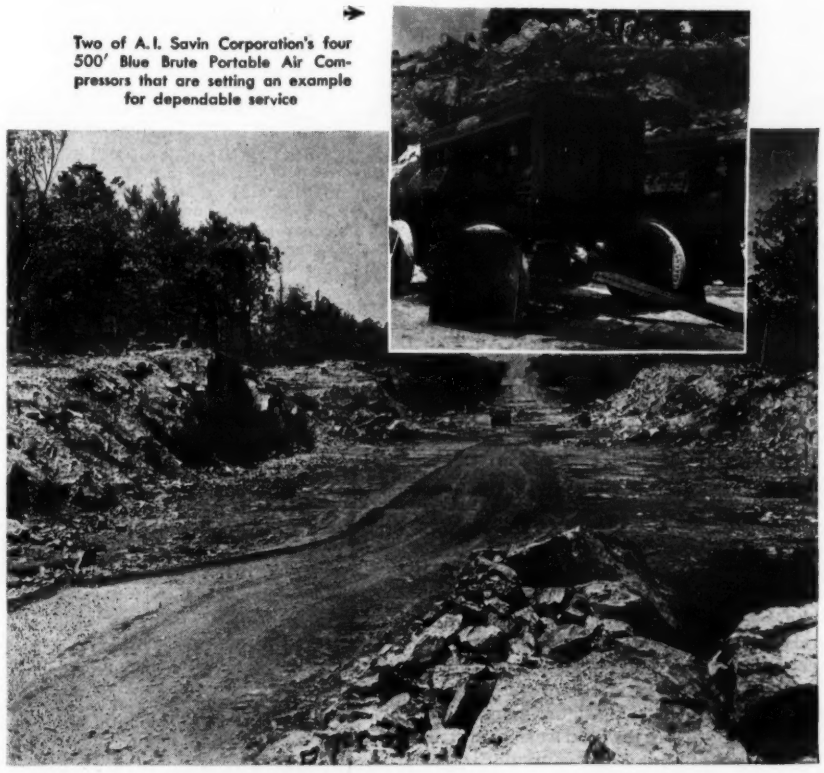
Fast, compact, efficient—Built with Timken bearings, Machined drum tracks—Silent transmission and other plus value features. See the CMC Distributor today —or write for catalog.

CONSTRUCTION MACHINERY CO'S.
WATERLOO, IOWA

Two of A. I. Savin Corporation's four 500′ Blue Brute Portable Air Compressors that are setting an example for dependable service



TOUGH GOING!... BUT BLUE BRUTES ARE TOUGHER!

On jobs like the Boston Post Road relocation project — with rock cuts containing 70,000 yds. in a single pocket — you soon find out what your air equipment can do!

A. I. Savin reports 100% satisfaction from Worthington Blue Brutes. It's easy to see why. Blue Brute 500′ Portable Air Compressors are packed with such advanced features as full force-feed lubrication and easy-breathing Feather* Valves—the most efficient ever made. No wonder these "portable powerhouses" have stood up under long, gruelling service without an extra minute down or an extra cent spent for repairs!

Also, Blue Brute UMW-40 Wagon Drills are the most versatile in the field . . . fast, powerful drilling machines that swing into action at any angle, to make short work of the toughest rock formation!

Adding up, here's a completely dependable air supply and air tools that make the most of it . . . a typical Blue Brute team that is beating schedules the country over. For further details that prove *there's more worth in Worthington*, see your nearby Blue Brute Distributor or write us direct.

*Reg. U. S. Pat. Off.
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HERE ARE THE FACTS

The A. I. Savin Corporation is using Worthington Blue Brutes to make a fast, economical job of one of the country's most difficult stretches of highway construction — 19,500 ft. straight through rocky, coastal Connecticut terrain on the relocated Boston Post Road.

Savin's Blue Brute 500′ Portable Air Compressors feed a battery of drills, wagon and hand-held. They have supplied air almost continuously for 5,000 hours at full rated capacity — without anything but routine, after-hours servicing!

The Blue Brute UMW-40 Wagon Drills on the project match this performance with consistent drilling through 22 ft. of mixed rock in 10 to 12 minutes!

Making fast speed through mixed rock! One of A. I. Savin's UMW-40 Blue Brute Wagon Drills in action

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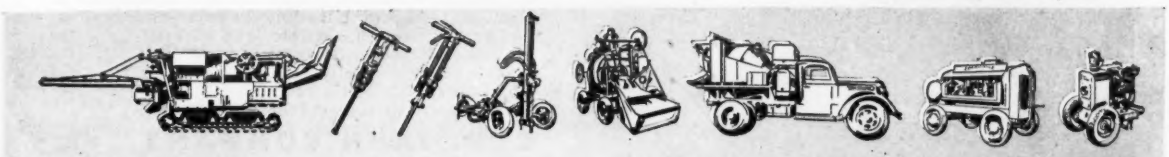

IF IT'S A CONSTRUCTION JOB, IT'S A BLUE BRUTE JOB

Concreting Set-Up At Fort Gibson Dam

(*Continued from preceding page*)

studs are 3 x 6 timbers. These timbers hold the 2 x 10-inch sheeting with which the heavy forms are faced. For all exposed concrete surfaces, Hydron, a U. S. Rubber Co. absorptive form lining, is stapled to the inside of the forms.

Forms are handled by the cranes which place the concrete.

Concrete Pouring

The actual placing of concrete follows a well defined and orderly sequence. When the project was visited, about 140,000 cubic yards had been poured out of a total of 461,300 cubic yards, and the pours were organized to the peak capacity of the mixing plant. With form work in place, the sequence of operations for each pour is about as follows:

1. Designated pours for the day are posted at the mixing plant, in the inspector's shack, and are given to the concrete foremen. The surface of the previously placed concrete of the designated pour is blown clean with air and water. Vent holes through which dirt and miscellaneous foreign matter are disposed of are then blocked.

2. The concrete foreman then picks up his telephone and orders what grout he needs. Grout usually comes in one and 2-yard batches, depending on the area to be covered. Grout is dumped on the previous pour, and broomed thoroughly with wide wire push brooms to cover the previous pour.

3. Pouring then commences. The concrete comes out to the job in Blaw-Knox concrete buckets, usually of 4-cubic-yard capacity, on Euclid flat-rack hauling wagons. Each Euclid hauls 8 cubic yards of concrete per load. The trucks are stopped by a truck spotter, who also hooks the load line from the gantry-mounted crane.

The main pouring crane is an American 25R Revolver with a 125-foot boom and a 30-foot fixed jib. This crane is gantry-mounted on a steel framework 70 feet high from the railroad rails to the car platform. The center line of the gantry track is 100 feet below the axis of the dam, and it is necessary to reach out about 30 feet above the dam axis. This can be done with the jib extension.

For some of the smaller abutment pours, a crawler-mounted Bucyrus-Erie 54-B crane was used, and on second-stage construction two American 25R Revolvers will be used.

The concrete buckets are hooked up by the truck spotter, swung up to the pour by the crane, and maneuvered into the proper place with the help of a visual signalman on top of the pour. It is expected that some telephone communication may also have to be used later. When the concrete bucket is in position, a dump man climbs up on the bucket frame and dumps the concrete into the form. It is necessary to swing the big buckets quite close to the forms where exterior concrete is being placed, but so far this has been done successfully without damage.

The concrete is placed in lifts approximately 18 inches thick, and vibrated by 2-man Viber vibrators to reach through the heavy layers. Pouring continues in 18-inch lifts until the block is finished up to screed lines established by surveyor's levels. At this point the concrete is leveled off with shovels, and the placing crew moves on to the next pour.

4. As soon as the concrete takes its initial set, but is still green enough that men have to step gingerly on its surface, workmen come in with high-pressure air and water hose. All excess fines are cut off the pour, leaving the clean tops of large aggregates protruding from the surface. This furnishes a good bonding surface for the subsequent pours.

5. The concrete surface is then cured by installing full-revolving-type water sprinklers, similar to those used on golf courses over the country, in the center of the pour. Water under steady pump pressure then reaches all parts of the pour and cures the concrete. Hunt Process black curing solution is used on the sides of the pours after the forms are stripped, and Hunt Process clear concrete-curing solution is used on the exposed faces of the dam after the forms are stripped.

Dam Will Control Lower River

Fort Gibson Dam, when completed, will be a vital part of the three-reservoir system on the Grand or Neosho River. Pensacola Dam is already built, farther upstream, and is now actively storing floodwater and generating power. Fort Gibson Dam will also control floods near the mouth of the stream, and, when its ultimate power facilities are installed, will have a total generating capacity of 73,800 kilowatts.

In the second-stage construction, most of the spillway will be built. Second-stage construction also includes a 287-foot earth embankment near the right abutment.

Personnel

The dam was designed and is being supervised under the general direction of Colonel C. H. Chorpening, Tulsa District Engineer for the Corps of Engineers. F. M. Newell is Resident Engineer and Frank Bosche is Assistant Resident Engineer.

The general contract is held by a joint venture consisting of the Al Johnson Construction Co. (the sponsor) of Minneapolis, Winston Bros. Co. of Minneapolis, and Peter Kiewit Sons, Co. of Omaha. O. S. McCormick is General Manager of the project, "Big Al" Johnson is the General Superintendent, and Harlo Haagenson is Project Engineer.

White-Roth Has New Head

George L. Roth, former Vice President, is now President of the White-Roth Machine Corp. of Lorain, Ohio, manufacturer of gasoline and diesel engines, compressors, and special equipment for the construction industry. Mr. Roth succeeded G. A. White who retired.

Other new officers include Vice President I. G. Roth, Secretary M. J. Powers, and General Manager Harry Youtt.

Wood-Study Lab Expanded

Laboratory facilities for wood research have been expanded by the Timber Engineering Co. of Washington, D. C. A new 60 x 60-foot one-story addition to the Teco lab will give the company more elbow room for research studies it now has under way—such as the development of a practical, economical way to decrease the shrinking and swelling of construction lumber.

• For Operating Power Tools • Floodlights • Field Repair Shops • On Service Trucks • Paving Machines • Power Shovels • Earth Moving Equipment, etc.

"U.S." BUILDS A COMPLETE LINE of Gasoline and Diesel Electric Plants up to 140 KW—for stand-by, continuous duty, battery-charging, and portable uses. Skids, rings, porter bars, and trailer mountings available. Write for literature, stating type of unit and capacity required.

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Tilt—load—and you're off in a matter of minutes with a Jahn Tilt Trailer. No jacks or loading ramps required. One-man operation. Positive, automatic safety lock holds platform in position when loaded or empty. Rubber mounted drawbar absorbs road shocks and protects both truck and trailer. Ideal for transporting tractors—rollers—compressors—shovel-loaders—mixers, etc. Jahn Tilt Trailers are available in 8 ton capacity tandem axle and 5 ton capacity single axle models. Write for specifications and illustrated bulletin or see your nearest Jahn distributor.

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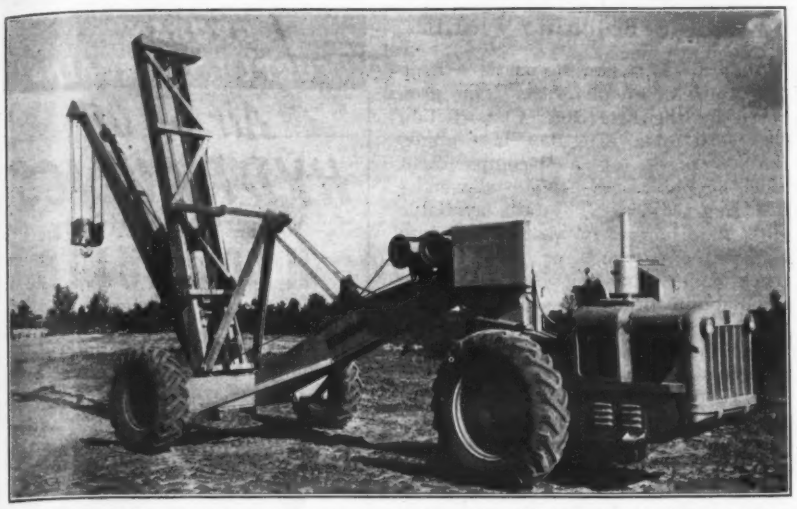

A 3-way positive electric control for pin-point spotting, lifting, and placing the load features the new 7-ton-capacity EC-7 Tournacrane.

Lift-and-Carry Crane Has 7-Ton Capacity

A new one-man-operated lift-and-carry crane is announced by the Tournalayer Division of R. G. LeTourneau, Inc., Longview, Texas. The EC-7 unit is similar in design and construction to the previously introduced 15-ton Tournacrane. It has a 7-ton capacity, a maximum lift of 29 feet 6 inches, and a maximum reach of 31 feet behind the center line of the crane wheels. Motive power is furnished by a Model D roadster-type Tournapull.

The elevator track is adjustable to any angle from a horizontal position to 14 degrees forward of vertical. The angle of inclination rearward is designed to increase the flexibility of the crane and to reduce to a minimum the overall clearance or headroom needed.

Lifting and placing of the load is controlled by a 3-way electric control connected to three Tournatorque electric motors. They are fed by a high-capacity generator mounted in line with the engine. One motor raises and lowers the pulley block, one raises and lowers the boom, and a third determines the angle of the boom track. A fourth motor is used for positive steering of the Tournapull unit. Positive braking is applied to the load the instant the electric motor is stopped by an automatic slip-proof brake. All operations are controlled by means of finger-tip buttons on the instrument panel.

The crane is said to lift its rated capacity without the use of outriggers or counterweights, and then to carry it safely on either smooth surfaces or across rough terrain. The EC-7 can, according to the manufacturer, reverse its direction and move away in a 20-foot area, in one continuous forward movement. The forward wheels of the Tournacrane are steerable and tractive. A Tournamatic differential allows the wheel with the greatest traction to have the most power.

Optional accessories include a detachable lift fork and ram; a motorized tag line for use in operations over exceptionally rough terrain when handling precision equipment, or in placing loads when the crane is on a slope; multiple-disk air brakes on rear wheels; and a cab for the prime mover. The unit is designed to carry loads at speeds ranging up to 28 mph.

Further information may be secured from the company, or by using the enclosed Request Card. Circle No. 94.

Flexible Safety Goggles

A bulletin which points out the features of MonoGoggle eye-protecting safety goggles is being distributed by Willson Products, Inc., 200 Thorn St., Reading, Pa. Among these features are extreme flexibility, light weight, nontoxic frame, chemical resistance, stability over a wide range of temperatures, and comfortable face fit.

The bulletin describes each of these in detail and points out how they aid the wearer's comfort and safety. Illustrations show how the goggles can be used over prescription glasses and how the lenses are replaceable. Also listed are the sizes and styles in which the goggles are provided.

Copies of this literature may be obtained from the company. Or use the enclosed Request Card. Circle No. 73.

Film Describes Spray Unit

A new film made available by the Flex-Plane Co. of Warren, Ohio, features the company's automatic spray machine for applying membrane concrete-curing material. The film shows the Flex-Plane machine in use on a state highway project. It depicts how the double-spray pattern is evolved, and how this aids in obtaining a uniform spread of the material. The film also shows the details of such individual features as the single external-mix-type spray gun and the 60-gallon constantly agitated pressure tank.

The film is completely titled to help explain the various steps being illustrated. Printed on 16-mm film, it runs approximately 10 minutes. Copies are available for use by writing to Flex-Plane, Warren, Ohio.

Catalog on Roll Crushers

"Crushing Power", a new catalog on roll crushers, has been prepared by the New Holland Mfg. Co., Mountville, Pa., a division of the New Holland Machine Co. It illustrates with photographs and diagrams the features of New Holland roll crushers. It also contains special tables of complete specifications, and figures on maximum feed size, horsepower, and capacity for each model.

Copies of this literature may be obtained from the company. Or use the enclosed Request Card. Circle No. 61.

For Over 70 Years Builders of Fine WHEEL BARROWS:
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Up-to-date highways need modern guard rail protection. Here's why it will pay you to install the TUTHILL Guard Rail:
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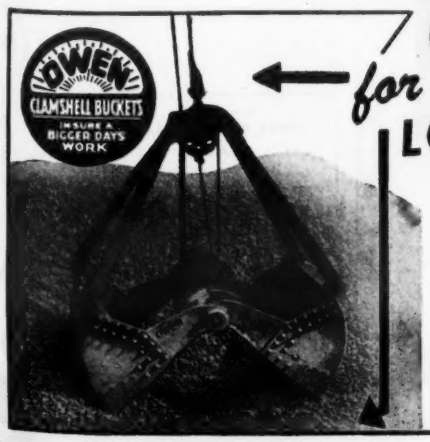

for OWEN BUCKETS *are popular* LOW HEADROOM and thus are more adaptable to various operating conditions.
Owen Bucket heads are one-piece alloy steel castings, light enough to prevent top heaviness and designed for rigid arm connections.
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Now.. YOU CAN CONVERT YOUR PIPE BENDER TO POWER OPERATION

Enjoy These Benefits — Less Fatigue . . . Work More Bends Per Hour . . . Savings in Time . . . Extra Versatility

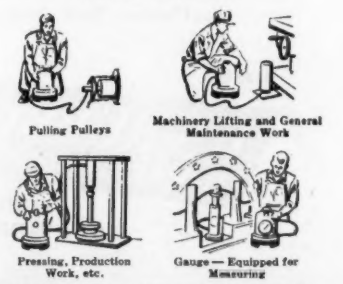
Here's Why It's a "Profit Package" for You

Economy — P-182 pays for itself on labor-saving alone. One electrical contractor estimated a saving of $63 in FOUR HOURS . . . through labor savings in making offsets on 60 pieces of 1½" pipe.

Speed — This handy pump slashes pipe bending time. Full ram travel can be obtained in ⅓ the time it takes with hand operation. And P-182 never tires — it works at top speed all day — turns out more than 3 times as much work as a hand operated pump.

Versatility — P-182 is a complete package containing pump, valves, and controls. Conversion is simple — disconnect your hand-operated Porto-Power pump, connect P-182 and go to work. It takes the place of one or many hand pumps, handling 2 to 25 rams at one time. And P-182 is adaptable to any hydraulic system.

BE SURE YOU GET THIS EXTRA UTILITY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Truck Conversion Units

Equipment for increasing the service of standard trucks is described in literature put out by the Trucktor Corp., 156 Wilson Ave., Newark 5, N. J. The company manufactures a specially designed third axle to provide trucks with trailer capacities, and a chain-and-sprocket 4-wheel-drive unit to provide standard trucks with 4-wheel drive efficiency when the need arises for this type of drive. Ordinarily, the truck is run as a standard unit with the resulting maintenance costs of the 2-axle type of truck. Units are made in a wide range of models to fit all standard makes of trucks.

The Trucktor third axle comes in four models for use with trucks ranging in maximum gross capacity from 5½ to 10½ tons. The new bulletin lists complete specifications for all four units, and covers the axle, springs, torque arm, spring-seat bearing, cross shaft, chain-and-sprocket load divider, frame brackets, shackles, tire sizes, brakes, bushings, and shackle pins. It features a large diagram which points out the principal parts of the unit.

The Trucktor detachable chain-and-sprocket 4-wheel drive is also fully described in a special folder. This folder points out the uses of the unit and its features of operation, including the way it is installed or detached. It also contains photographs of the unit installed on several types of trucks.

Copies of this literature may be obtained from the company. Or use the enclosed Request Card. Circle No. 84.

Represents Belt-Lacing Co.

William W. Hickey now represents the Flexible Steel Lacing Co. in the New England and New York territory. He succeeds John Ramsey who has been transferred to the executive sales office in Chicago. Mr. Hickey's appointment came after intensive training in the company factory which turns out steel belt lacing, V-belt fasteners, belt cutters, belt tools, etc.

Portable Batching Plants

A 4-page folder on the portable Type GA AggreMeter plant has been prepared by the Erie Steel Construction Co., Geist Road, Erie, Pa. These plants are composed of a 3-compartment batching bin and a 3-material-weighing AggreMeter. They are available with wide hopper for discharging into compartment trucks or with special truck-mixer charging hoppers. They are made in three sizes—36, 52, and 68-cubic-yard capacities.

The folder, No. GA1, illustrates plants of each size set up on a road or general construction project. It also pictures the bin-hopper section with hinged legs and an AggreMeter unit attached. The final page of the folder shows a layout drawing of the erected Type GA plant, and includes a detailed description of the Erie 3-material-weighing Type BWF AggreMeters.

Copies of this literature may be obtained from the company. Or use the enclosed Request Card. Circle No. 66.

ATTENTION

DAM CONTRACTOR

DON'T stick your neck out.

Before you make a bid involving rubber Gate and Lock Seals, Water Stops, or other molded parts, get accurate costs *FIRST* from a manufacturer who has had plenty of experience in working with dam engineers.

Many a contractor has underestimated the cost of these items . . . not realizing that they are made to accurate specifications from special high-quality rubber compounds that must give trouble-free service for many years.

Play safe, consult with an engineer from U. S. Rubber. You'll probably save money, if you do.

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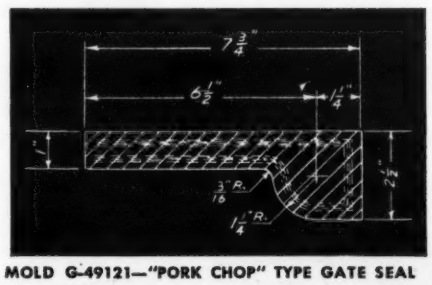
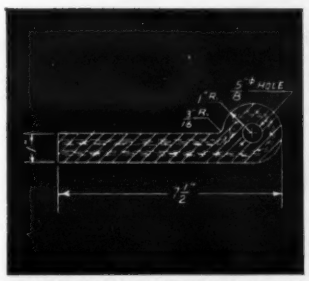
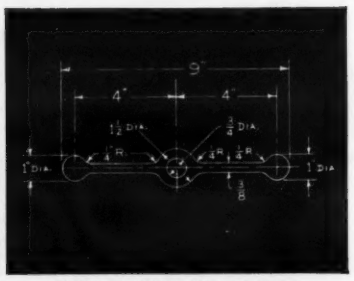


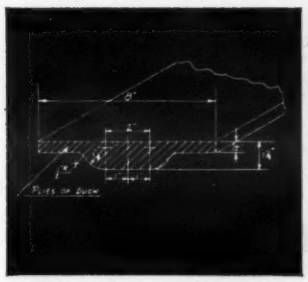
MOLD G-49121—"PORK CHOP" TYPE GATE SEAL



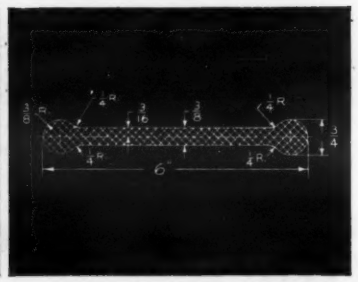
MOLD G-49123—"J" TYPE GATE SEAL



MOLD G-49125—WATER STOP



MOLD G-49143—CAISSON SEAL



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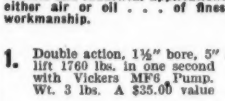

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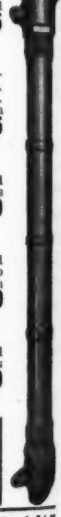
Use hydraulics on arbor presses, hydraulic presses, hay lifts, manure loaders, lift trucks—push or pull, tilt or turn, press or squeeze, open or close, lift or lower—and other hydraulic and industrial applications. Use with either air or oil . . . of finest precision workmanship.



1. Double action, 1½" bore, 5" stroke, will lift 1760 lbs. in one second with Vickers MF6 Pump. Wt. 3 lbs. A $35.00 value $8.95 postpaid
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3. Use these cylinders on farm trucks, bulldozers, hay lifts, manure loaders, etc. Double action, 1½" bore, 27" stroke. (Will lift 1760 lbs. in 2 seconds with Vickers Pump.) Wt. 8 lbs. A $55.00 hydraulic cylinder value for only..... $12.95 postpaid
4. Double action, 2⅜", 8" stroke. (Will lift 4400 lbs. in one second with Vickers Pump). Will withstand 1500 P.S.I. against wall. Wt. 7 lbs. $65.00 value..... $14.50 postpaid
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6. Double action, 3½" bore, 11" stroke. Will lift 9600 lbs. in 7 seconds using Vickers MF6 Pump. Complete with fittings. Wt. 15 lbs. A $92.00 value..... $22.50 postpaid

Brand New HYDRAULIC CONTROL VALVES

Outlets are standard ⅛" pipe thread and inlet takes standard ¼" copper tubing fitting.

1. Four-way control valve for use with double action hydraulic cylinder, may be used with 1500 P.S.I. hydraulic system to open and close hydraulic cylinders. Brand new. Ship. wt. 4 lbs. A $38.00 value..... $7.95 postpaid
2. Four-way control valve for use with two hydraulic double action cylinders. Each cylinder may be operated independently of the other or in conjunction with the other. Oil may be locked in any of the cylinders to hold the piston at any required position. Brand New. Ship. Wt. 6 lbs. A $60.00 Value..... $10.95 postpaid
3. Same as valve item 2, except that unit is designed for three double action cylinders. Brand New. Ship. Wt. 8 lbs. A $72.00 value..... $12.95 postpaid
4. A two cylinder double action valve with a unique arrangement, allowing the operator to raise both cylinders simultaneously, to lower them simultaneously or to raise one and lower the other at any predetermined rate and speed. Brand New. Ship. Wt. 8 lbs. A $75.00 value..... $14.95 postpaid

Brand New CHECK and RELIEF VALVE $2.95 postpaid
ADJUSTABLE FOR ANY PRESSURE

Vickers MF6 Hydraulic Pump or Motor

Compact, powerful, rated 1,000 P.S.I., .507 cu. in. per revolution, 8 gal. per min. at 3750 r.p.m. Change rotation by reversing flow. Delivers up to 6 H.P. BRAND NEW. Wt. 4¼ lbs. $60.00 value for..... $14.95 postpaid

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Distributor Doings

Holmes-Talcott Extension

The Holmes-Talcott Construction Co. of Hartford, Conn., is planning to extend its present quarters at 599 Franklin Ave. Two structures are to be built at an estimated cost of $40,000—a 44 x 29-foot extension to the present office area; and a 38 x 59-foot addition to the repair shop. The buildings will be of brick and reinforced concrete and will feature large window areas. The garage addition will be constructed with a steel framing.

Cummins Nebr. Dealership

The Omaha, Nebr., Cummins dealership, formerly operated by the Interstate Machinery & Supply Co., has been acquired by Cummins Engine Co., Inc. It has been reorganized as Cummins Diesel Sales Corp. and will be run as a wholly owned Cummins subsidiary. It occupies a new location at 50th and Center Streets in Omaha.

The dealership will maintain complete service facilities and a complete stock of Cummins diesel engines and parts. Kendall L. Vinton, formerly Manager of the Peoria, Ill., branch of Cummins Diesel Sales Corp. of Illinois, has been appointed Manager of the Omaha subsidiary.

R. I. Showroom Completed

The J. S. Main Equipment Co. of Providence, R. I., has completed the construction of its new headquarters at 801 Taunton Ave., E. Providence. It will house the Main offices, showroom, and service facilities. The Oliver Corp., LaPlant-Choate Mfg. Co., Inc., and other lines are represented by the company.

Hinz Joins W. H. Anderson

Arthur C. Hinz is the new Sales Manager of W. H. Anderson Co., Inc., construction-equipment dealer located at 47 W. Seven Mile Road at John R. St., in the city of Detroit, Mich. Mr. Hinz formerly was with Gar Wood Industries, Inc., of Wayne, Mich. Among the lines handled by Anderson are: Buffalo-Springfield Roller Co., The Euclid Road Machinery Co., George Haiss Mfg. Co., Inc., American Hoist & Derrick Co., Electric Tamper & Equipment Co., Worthington Pump & Machinery Corp., Novo Engine Co., The Buda Co., Knickerbocker Co., Cleveland Trencher Co., The Thew Shovel Co., Wellman Engineering Co., and the Concrete Surfacing Machinery Co.

Blaw-Knox Dealer in Maine

The Blaw-Knox Division of the Blaw-Knox Co. has appointed The Southworth Machine Co. its exclusive representative in the state of Maine. From its offices at 30 Warren Ave. in Portland, Southworth will handle the complete line of ready-mixed-concrete paving equipment manufactured by the division.

Minn. Agent for Economy

The R. G. Dinham Co. of Minneapolis, Minn., has been named a distributor by Economy Pumps, Inc., of Hamilton, Ohio. Located in the Wesley Temple Bldg., Dinham will handle the complete line of Economy centrifugal, axial-flow, and mixed-flow pumps.

Barnes Represented in NYC

Nielsen Hydraulic Equipment, Inc., has been named to handle the John S. Barnes Corp. line of hydraulic structures, pumps, controls, and fluid-power units, in the New York area. Located at 441 Lexington Ave., New York 17, N. Y., Nielsen will cover the metropolitan area and the eastern section of the state as far west as Utica in Oneida County.

Davey Names Two Dealers

Two dealers have been appointed by the Davey Compressor Co. of Kent, Ohio. They are: The National Mill Supply Co., 207-17 E. Columbia St., Fort Wayne, Ind.; and the George Park Tractor Co., 1900 Broadway, Macon, Ga. Park Tractor will cover the northern section of Georgia adjacent to the territory handled by the Florida-Georgia Tractor Co.

Air-Motor Starters

Air motors for starting internal-combustion engines are made in two sizes by the Ingersoll-Rand Co., 11 Broadway, New York 4, N. Y. These motors are keyed or splined to the Bendix or starting mechanism, and the engine is cranked just as an automobile engine is turned over when using the electric starter.

At 90 psi air pressure, the Size 9BM is rated at 9 hp and the Size 20BM is rated at 20 hp. Overall lengths for the two units are 13 3/16 and 14½ inches. The air motors are of the Multi-Vane type and have a quick-opening throttle valve designed to give peak horsepower almost immediately.

Further information may be secured from the company, or by using the enclosed Request Card. Circle No. 102.

Let HYDRAULICS lift your equipment

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HY-LO-JACK FAN BELT DRIVEN

POWER HYDRAULIC CONTROL

Lifts equipment ten times faster than hand pump. Easy installation on new or existing equipment. Hundreds of applications, such as Snow Plows, Sweepers, Power Mowers, etc. Priced for the most conservative budget.

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MONARCH ROAD MACHINERY COMPANY, 327-329 Front Ave., N.W., Grand Rapids 4, Michigan

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"Public Relations" covers a multitude of activities.

Let the Public Know All the Highway Facts

(*Continued from page* 1)

a procedure for misleading or putting something over on the public. But every organization—particularly every public agency—has its relations with the public. And the problem is to make those relations *good*.

The first and most important way, of course, is to do an honest efficient job. A public relations program then becomes a matter of informing the public honestly about the job being done; and insuring that good will, not ill will, is created in every contact with the public. As one highway-department public relations man put it, "Greet every taxpayer as a friend". A combination of honest public information and friendly understanding will inevitably result in good public relations.

In this article we are concerned primarily with the public information job. But it is inevitable that the broader aspects of relations with the public will creep in. And they must be touched upon, at least, in considering a highway-department public relations program.

Reason for a PR Program

The reasons are many for informing the public on the activities of its highway department. In the first place, the public is paying the highway bill; it is therefore entitled to know what is being done with the money. Second, every highway department is a service organization; and a logical part of that service includes telling the public of its plans for better highways, of road conditions, of emergencies and hazards when they exist, of the reasons for the road work under way—or the lack of it. Then too, the full light of publicity on the highway department and its activities tends to discourage any venal or selfish interests which might like to take advantage of highway funds for their own purposes. Reporting fully to the public on every phase of department activity builds public confidence in the integrity of the department. And finally, since support of a highway program adequate to the country's needs must come from the public, giving the public all the highway facts will help secure that support.

It is no longer necessary to "sell" the public on good roads; but it is very necessary to *tell* the public about highway plans, problems, and what is being done with highway funds. So it becomes, in the main, a matter of *how* to make the highway facts available to the public.

Setting Up a PR Office

The first step to be taken by those highway departments which do not now have a public relations office is, of course, to set one up. In many cases, this means securing an authorization to spend money for the purpose. The amount needed varies. Some of the most active and successful highway-department public relations offices are operating on a "shoestring". The amounts budgeted for public relations in those states which already have such offices show a wide range. And they are not particularly indicative, since the scope of an office may be limited or may extend to preparing the annual department report, putting out maps, etc. Total salaries range from about $4,000 to around $20,000, paid to an average of 5½ employees.

Some highway departments have established an independent public relations office or bureau, headed by a Director of Public Relations. Others consider public relations activities a function of the administrative office, with the man in charge carrying some such title as Executive Assistant or Executive Secretary to the Commissioner or Highway Director. The best set-up is the one which can be most readily and promptly achieved; second, which most satisfactorily fits in with the general administrative organization of the particular highway department; and third, which will insure an impartial, comprehensive, and effective public relations job.

Whatever the public relations officer is called, it is strongly urged that he be an experienced newspaper man, or one with a broad background in the publicity and public relations field. In addition to the obvious personal qualifications of character, integrity, and a good personality, knowledge of how to make contacts with the press and other media, and how to use those contacts, is of paramount importance. He can go to the engineers of the department for the technical information he needs. The very fact that he is a layman in the highway field will enable him to translate engineering terminology (once it has been explained to him) into language the public can understand. But experience in the newspaper or publicity field will have given him an understanding and appreciation of what makes news—something engineers are

(*Continued on next page*)

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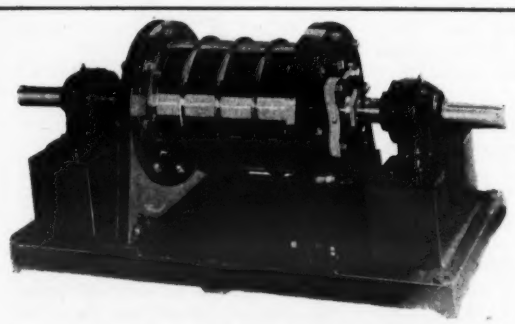

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Some highway-department public relations offices operate on a shoe string.

frank to admit that they lack—as well as the knowledge of how to present the story in an acceptable manner.

The public relations director needs, as a minimum staff, one full-time secretary-assistant who can handle his dictation (and incidentally, letter-writing itself is an important phase of public relations), prepare the stencils for mimeographed releases, type special stories and articles, and take care of routine office details. Additional clerical assistance is usually available by making use of the highway department's mail room, mimeographing and other duplication processes, etc. Care of press clippings is a time-consuming but important part of the routine. If possible, it is a help to have an additional member of the staff to handle that task. However, if the budget does not allow it, part-time services of one or more employees in other offices—telephone operators, or girls in the mimeographing or clerical departments—may be secured.

Some highway-department public relations offices—New York and Connecticut, for example—also have an engineer assistant. It is his duty to help prepare the more technical articles and feature stories and to insure the accuracy, from the engineering point of view, of all stories emanating from the public relations office. This arrangement is an excellent one, if it is feasible. If not, the public relations man must check with the department engineers on stories of this kind.

Though a professional photographer is a great asset to the public relations office, most highway departments cannot afford one. But free-lance photographers are usually available at reasonable rates for special assignments. And generally there are good photographers on the highway-department staff who regularly take pictures of projects for the department records. These men may be pressed into service to secure publicity photos. Or often, the pictures they take for the records may be used for publicity purposes.

Additional personnel required depends entirely on how many other activities and odd jobs fall into the lap of the public relations director. A public relations office can function efficiently and effectively with a staff of two. The largest staff reported totals thirteen.

As to the physical set-up—an office, a couple of desks and typewriters, a telephone, a filing cabinet, and a place to hang one's hat are the bare essentials. Since most highway departments have fairly extensive facilities for addressing envelopes, for mimeographing, multigraphing, and other duplicating or reproducing processes, it seems to be general practice for the public relations office to use them. New York is an exception to this; its public relations office has its own addressing and mimeograph machines. If such department facilities are not available, then it is essential for the public relations office to have its own, and for the public relations director as well as his assistants to know how to use them.

Where the highway department has its offices in a building which lacks a press room, the public relations director can make a friendly gesture to the press by inviting the reporters who cover the highway department and other state departments in the building to use his office as their press room. If space permits, an extra desk and typewriter for reporters' use will be much appreciated —and a friendly press is always an asset to a highway department.

The Media Available

As communications media are expanded, more and more ways of telling your story to the public are available. But the first and most logical medium is the press—the local daily and weekly newspapers which serve the communities of the state, and any local magazines published either by the state or by private publishers. Any activity or situation which affects any facet of the lives of the residents is "news" and as such will be welcomed by the local papers.

Next is the radio. Local stations will cooperate in broadcasting highway news and reports on road conditions in times of bad weather. Special features can often be developed in cooperation with station officials.

Special publications and reports on outstanding projects—such as New Jersey's booklet on its Freeway project or Connecticut's on the proposed reconstruction of U. S. 1 along the New Haven harbor front—serve a useful purpose. More detailed than news stories or even feature articles can be,

(*Continued on next page*)

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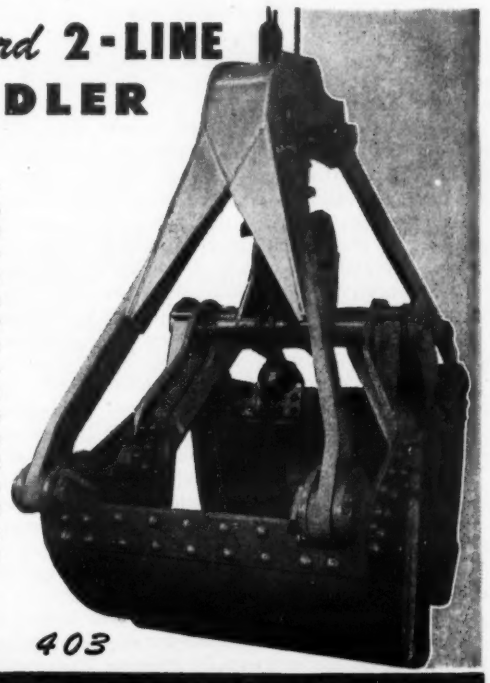

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Let the Public Know All the Highway Facts

(*Continued from preceding page*)

such publications provide background information for newspaper and magazine editors, for legislators, for organizations interested in good roads, for schools and libraries, and for the general public.

Movies too come into the publicity picture. While a professionally made film is expensive and beyond the budget of many state highway departments, good 16-mm movies can be made by department members who are camera fans or good amateurs. They can be shown at meetings of service, luncheon, and garden clubs; the local Grange; and similar gatherings.

Such gatherings are in themselves a medium for disseminating information on highways, proposed projects, and department activities generally. For department officials, including the public relations director, are welcomed as speakers at these meetings.

Fairs, expositions, and the like offer an opportunity for highway-department exhibits telling the story of the department's activities, featuring its traffic safety measures, or highlighting a special project. The start or completion of any outstanding projects with special significance for the community offers a chance to focus public attention on the project. Ground-breaking ceremonies, or ceremonies at the opening of a bridge or highway, provide an audience for department speakers, and usually get considerable text and picture space in the local papers.

And last, but by no means least, don't overlook job and detour signs as a medium of public information. These can do much more than slow down traffic or send the motoring public off over several miles of bad road. They can also inform the public, about the project and its purpose. And if they are courteously worded, they can help to foster good public relations.

How to Use the Media

In the matter of news releases for the press—how many and what kind—local conditions, the number and type of newspapers in the state, and similar factors must determine the policy. The public relations man's first job is to acquaint the editors of all papers in the state, as well as the reporters covering the capitol, of his desire to work with them, and to furnish honest accurate news on highway-department activities. Personal acquaintance with these newspapermen and a study of their papers and the types of communities they serve will provide a key to the kind and number of releases to be sent out, as well as to the frequency.

Calls for bids, lettings, road conditions, plans for highway improvement, general department policy decisions, and traffic safety are subjects for releases for general distribution. Stories on specific projects are usually sent only to the papers in that locality. The more stories are localized, the more likely they are to be used.

Some highway-department public relations offices send out several general releases a week. Others follow a more conservative policy, believing that editors who are flooded with many more releases than they can use may get into the habit of placing them all in that "circular file". As one experienced public relations man put it, "If you blow your trumpet too loud, people cover their ears and don't hear anything". In the general distribution of releases, it is important to time them so that the stories can come out in all papers at approximately the same time.

In addition to routine releases for general distribution, and releases of interest to only a portion of the state, there are feature articles and exclusive stories on some project or phase of the highway program. These are usually arranged with the paper's editor, and may stem from a suggestion by the public relations man or from an inquiry by the paper. They may be prepared by the department's public relations man. Or he may furnish the information, photos, charts or diagrams, and maps so the story can be prepared by one of the paper's staff writers.

One public relations man we interviewed makes a point of calling the newspaper editor in a community where a story is about to break, tipping him off, giving him the necessary background information, and letting him carry it as his "scoop". His experience has been that editors in his state like this kind of friendly and personalized cooperation. They, in turn, check with him before carrying any story about or affecting the highway department.

The same general policies apply to news distribution to the radio. All radio stations with their own news broadcasts should receive all news releases sent to the papers, or a version of the same news story specially prepared for radio. And practically all highway departments, whether or not they have a public relations officer, work closely with radio stations in times of floods, bad storms, or other emergencies, to inform the public as promptly as possible of driving conditions.

The radio also offers an opportunity for special features. In New Jersey, for example, a local station ran a series of weekly broadcasts entitled "Your State House Calling". These were interviews with various state officials, including the Highway Commissioner; the Highway,

(*Continued on next page*)

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Engineers are generally non-publicity-minded, so the public relations man has to "dig" for stories.

Bridge, and Maintenance Engineers; and the Highway Department Auditor. Subjects discussed ranged from New Jersey's Freeway program to how the department records are kept. The Michigan Highway Department has a weekly radio program on some 25 Michigan stations, stressing safety programs, describing tourist attractions, and generally informing the public on the work the Department is doing.

However, one public relations man has expressed the view that radio speeches should be used with restraint. Feeling that we are all being talked to death by the radio anyway, he believes it should be used only for special events such as ground-breaking ceremonies or the opening of a new highway or bridge. Arrangements can generally be made with the local radio station to broadcast such ceremonies with appropriate fanfare and speeches.

Usually stories are sent out in the standard form of mimeographed news releases. However, mats help secure the use of the material if there are a number of small rural papers in the state, or if charts, maps, etc., are to be included. In Oklahoma, for example, wide use is made of mats. And it is reported that they find greater acceptance than stories which have to be set in type.

One phase of Oklahoma's public-information service is a series of such mats, featuring a photo of one of the highway-department engineers and a brief story (in some cases only 100-200 words) on his job and what it means to the traveling public. The theme of one such story was "Keeping Up 9,700 Miles of Road Is This Highway Man's Job". It included the Maintenance Engineer's photo and answered the question "What does the state maintenance engineer do?"

Humorous and human-interest stories, unusual occurrences, "finds", and discoveries of a historical or geological nature unearthed during the course of highway work, generally find wide acceptance in the press, and serve to remind the public once again of the highway department and its activities.

The public relations office is a source of information not only for newspapers and local magazines, but also for national business and technical papers interested in highway-department activities. In some states, it is also the duty of the public relations director to whip into shape articles which department officials are invited to write.

Relations With the Press

There are a few helpful rules for establishing friendly relations with these available media. Above all, be honest and frank and accurate. Send out as news releases only *news*. Editors are busy people, usually working against deadlines. And "news" is their business. To be flooded from some source with material of no news value soon undermines their confidence in the newsworthiness of any material from that source.

Another important factor is accessibility. No public relations man (indeed no public servant) should ever be too busy to see a representative of the press. And the public relations officer should urge the commissioner or director, if he is not public-relations-minded, to meet the press frequently, with cordiality and with complete frankness and honesty. All reputable newspapermen respect and comply with a request that information be considered "off the record". And complete openness and honesty in telling them all the facts will gain their confidence and usually result in a "better press" for the department and its activities.

Relations With Department

In addition to cordial relations with the press, it is important for a public relations man to get on a firm footing of cordiality and cooperation with the highway-department engineers and officials. Since most of the information to be made public must come from them, he often has to "sell" them first on the value of a public-information program, and then help them to see what kind of information is "news". For some time, at least, he may have to "dig" for stories in his department. And since engineers are generally non-publicity-minded, this frequently takes tact and patience and perseverance. However, highway-department engineers and officials are realizing more and more the value of a public relations program, and what informing the public can mean in gaining its support for an adequate continuing highway program.

Information on department activities should be coordinated and, as much as possible, should fit into an overall public-information plan, so it is well to

(*Continued on next page*)

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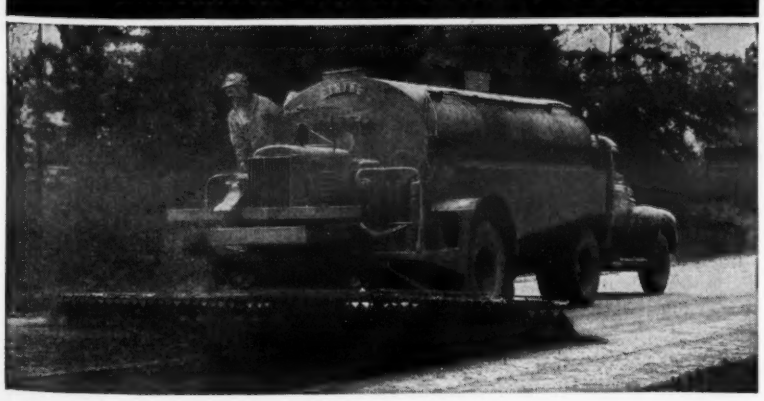

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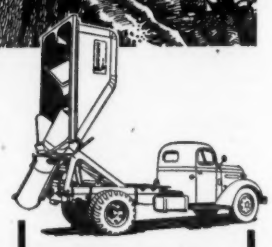

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Let the Public Know All the Highway Facts

(*Continued from preceding page*)

have all statements and releases for the public channeled through the public relations officer. This avoids the embarrassing situation of apparent conflict or disagreement within the department. And because the public relations man knows the ropes, he will release the information in the most efficacious manner.

Highway-department officials and engineers are very frequently invited to present papers at meetings of professional and technical societies and engineering associations, as well as to speak before local groups. The department public relations man can be of very great help in the preparation of such papers and speeches, and department members are urged to take full advantage of this available assistance. The same is true of articles to be written for regional or national magazines.

PR Man's Other Duties

Preparing the department's annual or biennial report is usually another of the public relations man's duties. While of a formal nature, this published report can be made interesting and readable by good concise writing and a judicious use of pictures. Its publication can be the occasion for a great deal of publicity for the department—a general summary of the report and the department's accomplishments, a statement of its financial needs to carry on the program, as well as special stories on phases of the work, statistical information, etc. Selective distribution of the report itself to editors, groups interested in good roads, and information centers, is a part of the public information plan.

Preparing and distributing state highway maps also falls to the public relations man in some states. And no public information service can be more useful in creating good will. Photos of scenic features and points of historical interest add to the appeal and attractiveness of these maps, while lists and locations of the more important sights for tourists are not only helpful to visitors to the state, but encourage more of them and tempt them to linger longer.

It is a logical step from the distribution of highway maps to the dissemination of touring information. So this is another job frequently handed to the public relations man. Most state highway departments are too busy with their primary job of providing the best possible highways for the traveling public to invite requests for touring information. But they come in anyway. And they range from requests for details on all the state's features for sightseers, to how to get in and out of the state as quickly as possible—with special cases such as the old gentleman who has trouble with his back and wants guidance in selecting a route with the minimum number of bounces and jolts. Here is an opportunity to create good will by handling these requests helpfully, promptly, and graciously. They take time, of course, but unless the state maintains its own tourist bureau to which it can turn over such requests, it is worth the time and effort expended to provide this type of public information too.

The highway-department public relations man generally finds that his office becomes a sort of clearing house for highway information of all kinds. It answers questions of the press. It does research for material to be used in speeches or articles by department officials. It handles all sorts of requests from the public—from schools, libraries, students who are writing papers, and so on. Answering these is a time-consuming and sometimes an irritating task. But each legitimate request presents a chance to pass along to the public accurate information about the state's highways, and to make, or keep, a friend for the highway department.

In some states—New Jersey, for example—right-of-way problems are also within the province of the public relations director. He arranges meetings with property owners for the purpose of discussion. He deals by personal contact with protests and complaints. He serves as liaison officer in arriving at compromises or satisfactory arrangements in the matter of right-of-way acquisition, house-moving, and similar problems affecting the highway department and the property owner. Usually, it is reported, a friendly and factual explanation secures the cooperation of the property owner. His objections are frequently based on misinformation or ignorance of the overall objectives of the project, and reasons for it. Once these have been explained, it is generally easier to secure his agreement or at least arrive at a satisfactory settlement. And the individual feels that he has been given a sympathetic hearing and that the highway department has "done right by" him.

There are many little gestures which help to engender that feeling. In dealing with the problem of moving houses from the right-of-way to a new location, one highway department has an artistic member of its staff prepare a sketch of the house in its new location. As it generally looks pretty nice, this often clinches the owner's assent. In this same state, the roadside-development bureau also cooperates in solving the house-moving problem. If the owner is particularly loathe to leave a pet wisteria or lilac bush, a roadside-development crew will carefully move the tree or shrub and replant it where the owner

(*Concluded on next page*)

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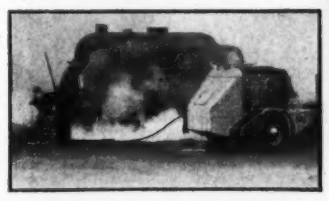

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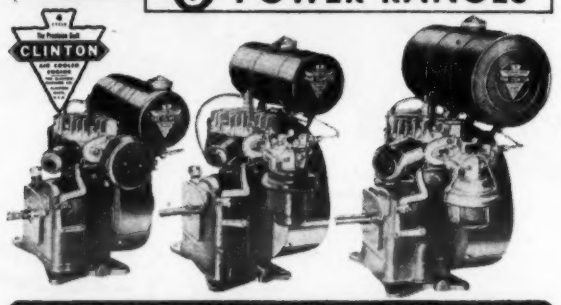

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wishes on the new site—another type of friendly gesture which makes for good public relations.

If the public relations man's job includes dealing with right-of-way and related problems, it follows that other types of public protests and complaints will be passed along to him. There is little need to elaborate on the variety or complexity of these. Every highway official is all too familiar with them. But how they are handled determines whether the complainant becomes a supporter or a derogator of the highway department. Courtesy as well as honesty is essential in all public relations. And greeting every taxpayer as a friend usually makes him one.

The public relations director's role as liaison man between the department and the public is a two-way affair. He can serve as the department's representative in dealing with the public. And he can also perform a very useful function in relaying to the commission and department engineers the public's reaction to policy and projects. While no highway department can base its policy on the desires of individuals or pressure groups, general public reaction should at least receive consideration. And the public relations man, in his contacts with the press and public, through his necessary perusal of the state's newspapers and the public's letters (generally protests), is best fitted to summarize public opinion for consideration and study by department officials.

As part of this information service to the department, he should also keep track of all bills introduced in the state legislature which affect the department or the highway program in any way. He should see that the proper department officials are informed of them. And likewise, he should see to it that copies of all legislation affecting the department are in the hands of the officials and engineers.

Another job to be done for the department is getting out a paper, magazine, or bulletin of some sort for department employees. The objective is that of all such "house organs"—to build morale, increase a feeling of departmental unity, and to keep the staff informed of the organization's work and accomplishments beyond the individual employee's bailiwick.

The format, frequency of publication, and budget for these publications vary. But most highway departments with such a publication keep it down to a modest and inexpensive affair. This in no way lessens its interest. Readability, interesting subjects, photos, personal items, a little humor, and the human-interest touch can make the least expensive publication an important factor in good department morale and organization.

The importance of this morale should not be overlooked. Every department member comes in contact with the public—from the commissioner down to the telephone operator and the member of the maintenance crew who sets up those "Men Working" signs. Public opinion about the highway department is being formed any time any member of the public has dealings with any member of the department. That impression will be a favorable one if courtesy and consideration are shown.

Department employees must realize fully the importance of their share in the public relations program. And their own paper can help develop their sense of responsibility for good public relations, can foster unity of purpose and cooperative effort for better service to the public.

It's a Big Job

At this point it might seem that a highway-department public relations director would have to be at least quadruplets in order to carry on his many tasks. Actually, not all of these duties may devolve upon any one public relations office, but combinations of many of them usually do. And it is a fact that in a number of states this varied and complex job is being handled effectively by a small staff. "Know-how", experience, and efficiency will do it. It is to be hoped that soon all forty-eight highway departments will be doing as good a public information and public relations job as some of the states are doing now.

For helpful information used in the preparation of this article, we are indebted to: William H. Buracker, Commissioner, Massachusetts Department of Public Works; William C. Murray, Executive Assistant, Connecticut State Highway Department; Frank A. Reddan, Director of Public Relations, New Jersey State Highway Department; Carl W. Held, Executive Secretary, Oklahoma Department of Highways; and Robert J. Shillinglaw, Public Relations Officer, New York State Department of Public Works.

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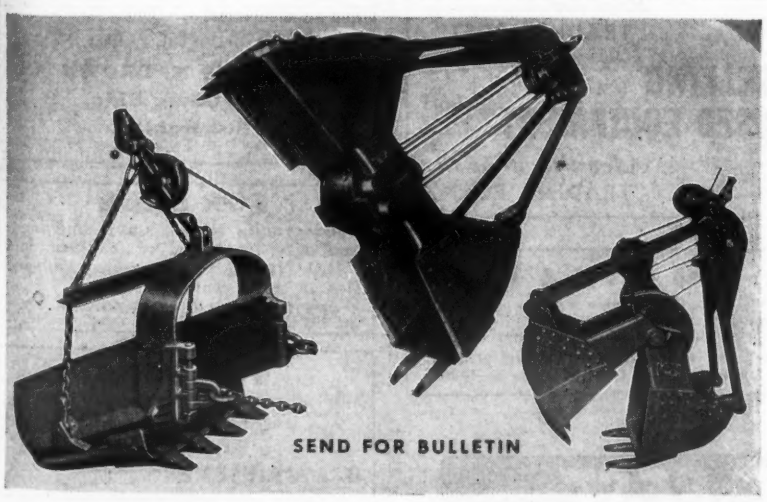

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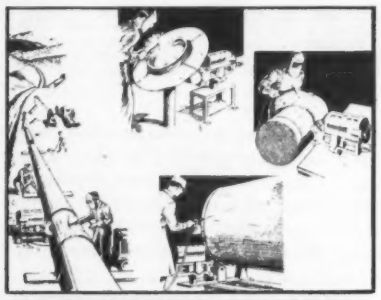

Here are a few of the applications for the Kinmont power unit, designed to rotate round or nearly round objects.

Electric Power Unit Turns Round Objects

A power unit designed to rotate round or nearly round objects is announced by Kinmont Mfg. Co., Inc., 718 W. Wilson Ave., Glendale 3, Calif. The power unit can be used to turn pipe while it is being welded at a joint or seam, to turn wheels and shafts while they are being repaired, and for other uses requiring a circumferential turning force.

The Kinmont unit uses a chain tong to surround the object which it is turning. This drive chain can be lengthened or shortened in order to fit the diameter of the object being worked. The manufacturer recommends the use of an adjustable roller fixture with large or heavy objects, to relieve the power unit from supporting the full weight of the object.

The power unit can be set to be driven by ac or dc motors in a wide range of voltages. It can also be plugged into any portable gas-driven arc welder in the field, the manufacturer states. A foot-switch accessory is available to permit remote control of the unit, and to leave both arms free to work. A reversing switch permits rotation of working material in either direction. The machine weighs 71 pounds and measures 40½ x 10⅛ x 15⅜ inches.

Kinmont has just recently transferred its headquarters to a new location in Glendale. It was formerly located at 5555 E. Slauson Ave., Los Angeles.

Further information on the Kinmont power unit may be secured from the company, or by using the enclosed Request Card. Circle No. 35.

Sawhorse Bracket

A mechanical bracket for use in setting up sawhorses is made by the Dalton Mfg. Co., 20 S. Central Ave., St. Louis 5, Mo. It is said to require no nails, bolts, or special cutting of the legs to attach. It is made of heavy-gage rust-resistant metal, and is available in sizes to fit 1 x 4's and 2 x 4's.

To apply the bracket, the lumber is inserted in the leg and rail sockets, and is then tightened down into place by means of a wing-nut adjustment. The vertical jaws have three teeth on the top edges designed to bite into the rail. The spreader plates, hinged to the leg sockets, automatically lock the legs securely into position, the manufacturer explains.

Further information may be secured from the company, or by using the enclosed Request Card. Circle No. 97.

Data on Theory, Design, And Use of Concrete Piles

An interesting catalog on piles—their construction and use—has been prepared by the Raymond Concrete Pile Co., 140 Cedar St., New York 6, N. Y. It is designed to present detailed information on all phases of pile theory and construction in a complete but concise manner. It describes the advantages of four types of piles—concrete, composite, steel, and wood—and lists applications for each.

The catalog contains a complete description, accompanied by drawings and photographs, of the construction of Raymond cast-in-place piles. It explains the the purpose of the shell, how it is constructed, and how it is driven; the purpose of the driving core and how it is removed; how the driven shell is inspected prior to pouring the concrete; and other important information. It presents technical data on permissible diameters and lengths with the various types of piles, their permanence, and their carrying capacities. It tells how to design for working loads and load tests, pile spacing, and the grouping arrangement for pile clusters.

Other information presented covers the Raymond soil-boring service and driving equipment; the use of precast piles and the use of caissons for foundation units; and examples of projects on which the Raymond piles or other specialty concrete work have been used.

Copies of this literature may be obtained from the company. Or use the enclosed Request Card. Circle No. 5.

Pulverizers and Crushers

A line of swing-hammer pulverizers and crushers is made by the Jeffrey Mfg. Co. And literature describing it can be obtained by writing to the company at 970 N. 4th St., Columbus 16, Ohio. One of these catalogs, No. 710-A, deals with the Type A and Type B pulverizers, and the Miracle Hammer and heavy-duty reversible-hammer crushers. Bulletin No. 811 explains the features of the Jeffrey Mud Hog crushers. And another bulletin, No. 801, lists all the products manufactured by The Jeffrey Mfg. Co. and its subsidiaries.

The catalogs point out the principal features of each unit by means of photographs and text. Major parts and accessories of the pulverizers and crushers are discussed individually. Tables list the various sizes in which each unit is made, its specifications, its dimensions, and its operating capacities. The catalog also lists recommended uses.

Copies of this literature may be obtained from the company. Or use the enclosed Request Card. Circle No. 83.

Tiffany Rights Are Sold

The business of Carroll R. Tiffany of Conklin, N.Y., has been purchased by Buckingham Mfg. Co., Inc., of Binghamton, N.Y. Among the items in the Tiffany line are tree pruners or lopping shears, pole pruners, bark scrapers, weeders, brier hooks, and other tree-pruning equipment. The new items will continue to bear the Tiffany name.

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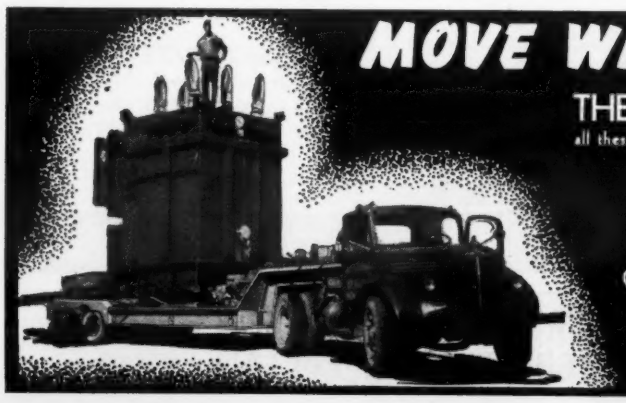
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High reverse speed backs up Tournadozer for each pass at speeds to 15 m.p.h. In dozing this means cutting the return half of your cycle by about two-thirds!

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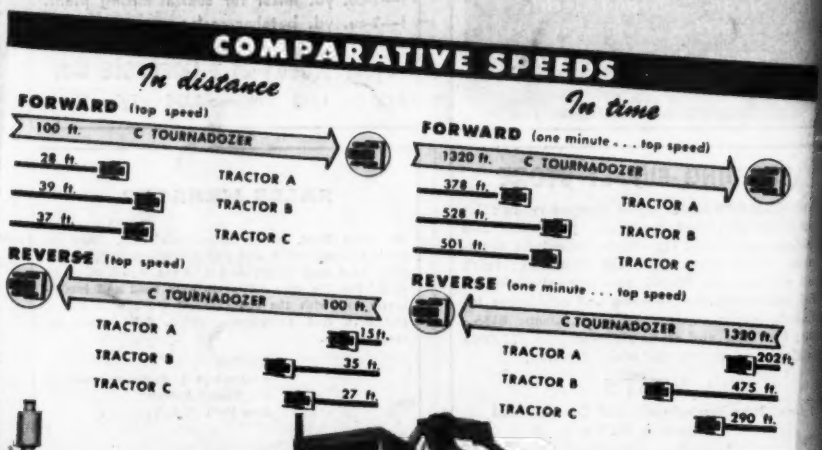
COMPARATIVE SPEEDS
In distance
FORWARD (top speed)
100 ft. C TOURNADOZER
28 ft. TRACTOR A
39 ft. TRACTOR B
37 ft. TRACTOR C
REVERSE (top speed)
C TOURNADOZER 100 ft.
TRACTOR A 15 ft.
TRACTOR B 35 ft.
TRACTOR C 27 ft.
In time
FORWARD (one minute . . . top speed)
1320 ft. C TOURNADOZER
378 ft. TRACTOR A
528 ft. TRACTOR B
501 ft. TRACTOR C
REVERSE (one minute . . . top speed)
C TOURNADOZER 1320 ft.
TRACTOR A 202 ft.
TRACTOR B 475 ft.
TRACTOR C 290 ft.

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